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sustainable solutions for ending hunger and poverty

Ensuring Food and Nutritional Security in Nepal

A Stocktaking Exercise

September , 2010

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Foreword

It is a pleasure to introduce IFPRI's report on "Ensuring Food and Nutritional Security in Nepal: A Stocktaking Exercise." IFPRI has conducted extensive research and compiled a wealth of information on agriculture and nutrition in Nepal. This report also includes recommendations on the next steps forward for addressing Nepal's medium and long-term food security issues.

The Government of Nepal has declared food security an urgent national priority. Although the majority of the population works in the agriculture sector, two out of three Nepalese people suffer food insecurity at some point during the year. Nutrition statistics are improving, but hunger is still far too common among Nepalese children.

This report comes at a time when USAID and other donors are demonstrating a renewed commitment to food security and agriculture. Agricultural development is a springboard for broader economic growth. Food security is an essential element for stability and opportunity. To this end, the U.S. Government's Feed the Future (FtF) initiative aims to significantly reduce hunger and poverty in 20 underdeveloped countries worldwide, including Nepal.

One of the key achievements of IFPRI's report is that this study is truly inclusive. A wide variety of actors provided input during workshops held throughout the writing of this report. These actors included representatives of government institutions, donor agencies, civil society organizations, the private sector, academia, and other relevant stakeholders.

We thank IFPRI and its local partner, the Institute for Integrated Development Studies, for putting together this comprehensive report. We hope this will be a useful resource for policy makers, development partners, and other stakeholders in developing strategies and solutions to address food security in Nepal.

Sincerely,

Kevin A. Rushing, D.V.M.
Mission Director
USAID/Nepal

Preface and Acknowledgements

Achieving food and nutritional security is at the forefront of global developmental challenges facing the world today. In order to meet the Millennium Development Goals of halving global hunger by 2015 there is a pressing need for large scale investment strategies to address the underlying causes. With the global food price spike in 2007 and 2008 sending alarm bells ringing, global leaders at the G8 Summit in L'Aquila, Italy in July 2009, committed to "act with scale and urgency to achieve sustainable global food security." Following this declaration the U.S. government launched "Feed the Future" (FtF) - a global hunger and food security initiative. Under the FtF, in order to increase effectiveness, priority has been accorded to twenty core 'Focus Countries', Nepal being one of them.

Nepal, despite a decade long conflict, has made considerable progress in reducing poverty and food insecurity since 1996. However, Nepal still faces significant food and nutritional security challenges, compounded in recent years by the high food prices, low economic growth, infrastructural constraints as well as natural disasters. Long term policies which help address poverty and strategic investments to enhance growth and raise incomes are required, especially in the agriculture sector. Global development experience reveals that growth in agriculture is at least two to three times more effective in reducing poverty than same growth through the non-agriculture sector. In Nepal, with the agriculture sector employing the majority of the workforce and contributing nearly 34% to the country's GDP, improving agriculture is of special importance to help fight poverty and hunger.

This stock taking report is a preliminary step in this direction and attempts to provide a comprehensive overview of the current food and nutritional security scenario in Nepal. Following the FAO definition of food security as *"a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"*, this report is structured around the three pillars of 'availability', 'access' and 'absorption'. It recognizes the importance of gender and governance factors cutting across the three pillars, and also explores the linkages between agriculture, poverty, various absorption factors and nutritional outcomes.

It is hoped that this report can form the basis for formulating further strategies and serve as a useful resource for policy makers, donor agencies and for other partner organizations involved in the development of Nepal. Also, this report can serve as a useful template for similar stock-taking exercises which are required in the other FtF focus countries as well.

The study was launched with the Inception Workshop held in April 2010 which saw many useful ideas and comments from numerous participants that helped shape this study. The Closing Workshop was held on 21st August 2010 with wide participation from government, donor agencies, private sector representatives and civil society organizations. The findings of the draft report were presented at the workshop and the authors' are extremely grateful to the comments and invaluable feedback received from the discussants and other participants at the workshop.

We are especially grateful to Dr. Jagadish Chandra Pokharel (Vice Chairman, National Planning Commission), Subodh N. Jha (Member, National Planning Commission), Purushottam Mainali (Joint Secretary, Ministry of Agriculture and Cooperatives) for their comments and guidance. Our thanks are also due to Tek Thapa (former Secretary, Ministry of Agriculture and Cooperatives), Fulgen Pradhan and Hira Kazi Manandhar (Chief of Planning Division, National Agricultural Research Council), Bhava Prasad Tripathi (International Rice Research Institute), Guillermo Ortiz Ferrara (International Maize and Wheat Improvement Center), Kanchan Lama (Women Organizing for Change in Agriculture & NRM- WOCAN), Ms. Jolanda Hogenkemp (World Food Program, Nepal) for their comments and inputs.

The authors' also extend their sincere thanks for the support from USAID. The comments and discussions with the USAID-Nepal team - Kevin Rushing, Jed Meline, William Patterson, Navin Hada, Amy Prevatt and Jennifer Billings and members of the USAID/EGAT Agriculture Office in Washington DC - Cheryl Jackson, David Hegwood, Mark Huisenga, Charles Uphaus and Anne Williams, were also very helpful and contributed to this report.

We express our sincere gratitude to Mohan Man Sainju for sharing his valuable insights and guidance and the IIDS team for their support. Discussions with Ram P. Sah and Devendra Chapagain* were invaluable. The study also draws on some material from the background paper prepared by Sah as well as some inputs provided by Chapagain. Our thanks are also due to the advisory team and the review committee for their incisive comments and feedback on the earlier drafts of this report.

Finally, our thanks are due to Bikas Bista (Deputy Director General) and Suman K. Aryal (Director) from the Central Bureau of Statistics and Hemraj Regmi (Senior Statistical Officer) from Ministry of Agriculture and Cooperatives for their help and sharing data related to different aspects of this study.

*(Devendra Chapagain withdrew before the end of the project due to personal reasons)

Table of Contents

List of Tables

List of Figures

List of Abbreviations

APP & MDD	Agribusiness Promotion & Marketing Development Directorate
ADBL	Agricultural Development Bank Ltd
AIC	Agricultural Inputs Corporation
APMMC	Agricultural Produce Market Management Committee
AMC	Agriculture Marketing Corporation
APP	Agriculture Perspective Plan
AEC	Agro Enterprise Centre
ADB	Asian Development Bank
BMI	Body Mass Index
CADP	Commercial Agriculture Development Project
CBS	Central Bureau of Statistics
CMR	Child Mortality Rate
CED	Chronic Energy Deficiency
CIMMYT	International Maize and Wheat Improvement Center
CV	Co-efficient of Variation
CMIASP	Community Managed Irrigated Agriculture Sector Project
DTW	Deep Tube Well
DoA	Department of Agriculture
DoI	Department of Irrigation
DoR	Department of Roads
DISSPRO	District Seed Production Programme
FMIS	Farmer Managed Irrigation Systems
FNCCI	Federation of Nepalese Chambers of Commerce & Industry
FY	Financial Year
FAO	Food and Agricultural Organization
F & V	Fruits and Vegetables
GoI	Government of India
GoN	Government of Nepal
GoP	Government of Pakistan
GDP	Gross Domestic Product

GDPA	Gross Domestic Product from Agriculture and Allied
ha	Hectares
HBS	Household Budget Survey
HDI	Human Development Index
IDR	Import Dependency Ratio
IMR	Infant Mortality Rate
ICIMOD	International Centre for Integrated Mountain Development
ICID	International Commission on Irrigation and Drainage
IDA	International Development Agency
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
IDD	Iodine Deficiency Disorders
IWRMP	Irrigation and Water Resource Management Project
LSGA	Local Self Governance Act
MDG	Millennium Development Goal
MoAC	Ministry of Agriculture and Co-operatives
MoE	Ministry of Education
MoF	Ministry of Finance
MoHP	Ministry of Health and Population
NCF	National Cooperative Federation
NFC	National Food Corporation
NDHS	Nepal Demographic and Health Survey
NPC	National Planning Commission
NSC	National Seed Company Ltd
NLSS	Nepal Living Standards Survey
NLFS	Nepal Labour Force Survey
NRB	Nepal Rastra Bank
PHCR	Poverty Headcount Ratio
PEM	Protein Energy Malnutrition
SSR	Self Sufficiency Ratio
STW	Shallow Tube Well
sq. km	Square Kilometers
TE	Triennium Ending
VDC	Village Development Committees
WB	World Bank
WFP	World Food Program

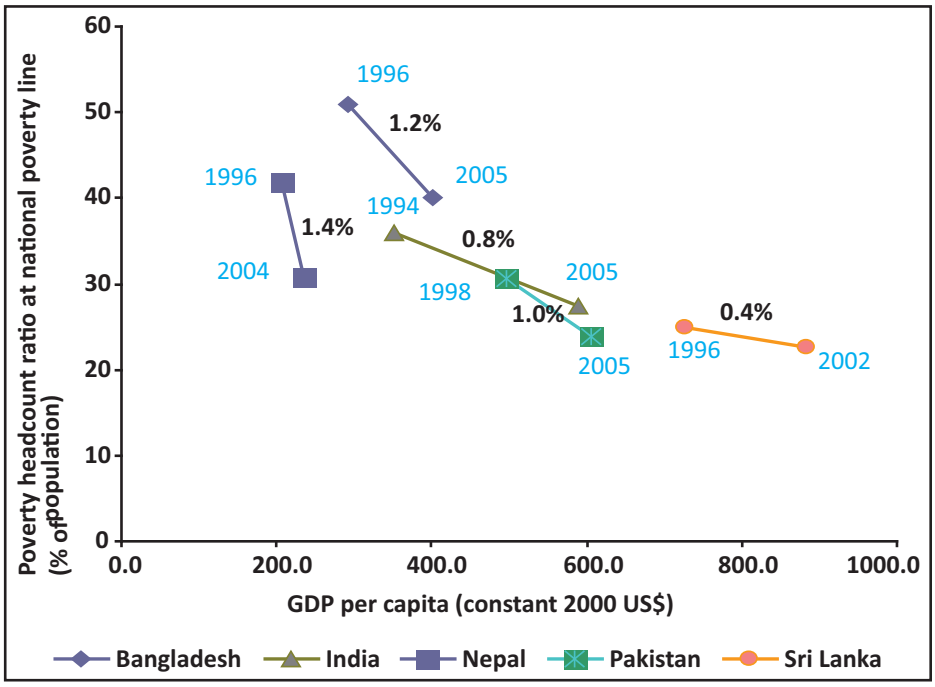
Executive Summary

Background

Nepal is a nation of rich cultural heritage and diversity characterized by a highly varied topography ranging from the fertile plains (*Terai*) in the south to the mountainous region in the north which is home to eight of the world's ten highest mountain peaks. Such dramatic contrasts in geography make Nepal a nation of scenic landscapes with a wealth of ecological and biodiversity resources. Even more dramatic, in socio-economic terms, has been Nepal's achievement in the rate of poverty reduction – in the period 1995-96 to 2003-04 Nepal poverty headcount ratio (PHCR) reduced from 41.8% to 30.9% translating to a poverty reduction rate of 1.4% per annum (Figure 1) which is the among the highest across South Asian countries.

However, in the more recent period (2000-07) the overall economic growth rate in Nepal has been lagging behind the rest of the South Asian countries with a 3.4% growth in gross domestic product (GDP) per annum. Nevertheless, its agricultural performance has been robust relative to other South Asian countries, with the gross domestic product from agriculture and allied sectors (GDPA) showing a growth of 3.3% in the period 2000-07 (Figure 2). This sector is crucial to Nepal's economy contributing 34% of the GDP and employing nearly 70% of the work force. Global development

Figure 1 Change in poverty headcount ratio (at National Poverty Line) and GDP per capita (constant 2000 US $) for South Asian countries (across differing periods)

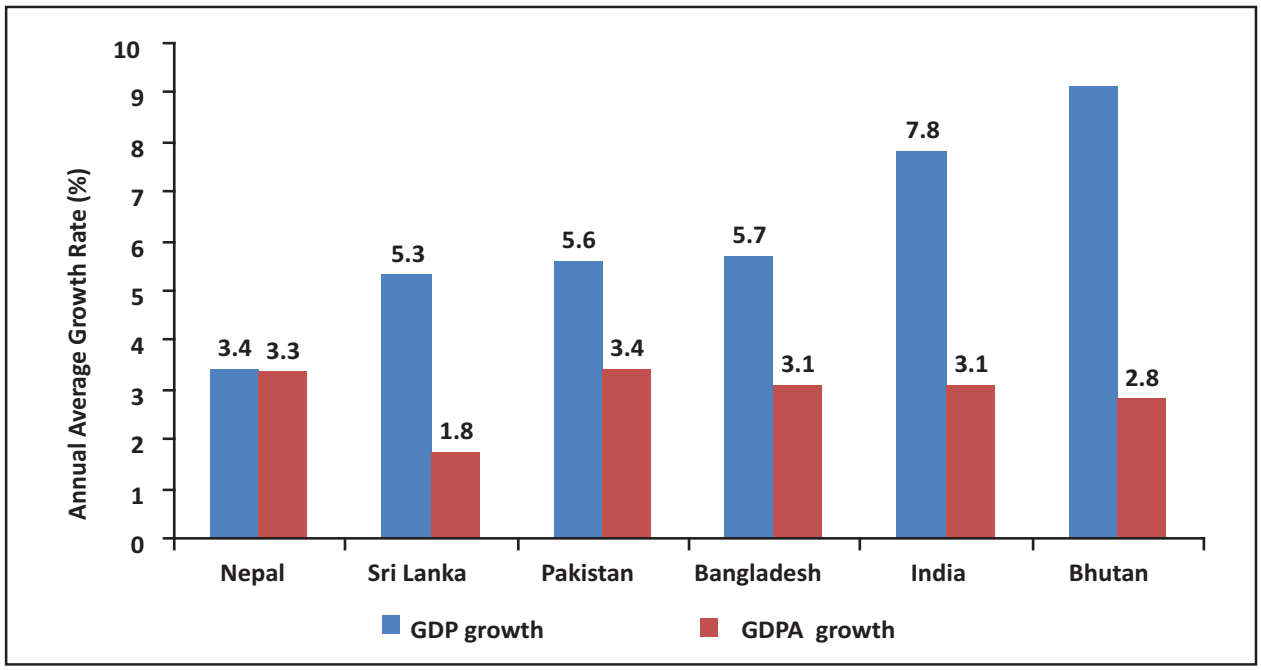


Source: WB, 2010; MoF, GoP, 2010

experience has revealed that growth in agriculture is at least two to three times more effective in reducing poverty than the same growth through non-agriculture sector (WB, 2008).

Along with the low growth rate of the overall economy, the level of per capita income in Nepal is also the lowest among South Asian countries. GDP per capita in 2008 (in terms of constant 2000 US$) was only US$254 (WB, 2010). This is reflected in the poverty levels in Nepal. Even with the rapid rate of reduction in poverty ratio during 1995 to 2003, Nepal still has the highest level of poverty incidence among South Asian countries with more than 50% of the population living below the revised World Bank (WB) norm of US$1.25 per day (although only 31% by national definition of poverty). Nepal also lags behind in terms of some nutritional indicators - for instance it has the highest percentage of children who are stunted as well as a relatively high prevalence of underweight among children below age five in comparison to other South Asian countries.

Figure 2 Economic and agricultural performance across South Asian countries (2000-07)



Source: WB, 2010

This study attempts to take stock of the food and nutritional security status in Nepal by looking at three interlinked aspects of the issue – *availability* of food from domestic production and trade, and the constraints to enhancing domestic agriculture production, *access* to food and the income, consumption scenario, and *absorption* factors crucial for translating food availability and access to better health and nutritional outcomes. The report also looks at issues of *gender* and *governance* which are crucial cross-cutting themes across the three "A's" of food security. This is followed by a preliminary analysis of the possible linkages between agriculture, poverty and nutritional outcomes and finally the report concludes by outlining the possible investment options and key knowledge gaps related to food and nutritional security in Nepal.

Availability for Food and Nutritional Security

In terms of per capita cereal supply from both domestic production and imports, Nepal actually fares better in comparison to rest of South Asia (with only Bangladesh having a higher value), even though domestic production growth in cereals has been lagging behind the population growth (Section 2.1 of the report provides further information). The net availability scenario with respect to high value foods such as fruits & vegetables, meat products and milk also compares well relative to other South Asian countries – fruits & vegetables availability in Nepal was the highest among South Asian countries at 114 kg/capita/year (FAO, 2010); milk and meat availability per capita is also fairly good (refer Figure 1.5 in Section 1 of the report).

Imports of cereals – both formal and informal trade across the open border with India – play an important role in meeting the cereal deficit. The import dependency ratio has increased steeply in recent years, reaching more than 3.5% in 2007 for cereals and Nepal's overall food trade deficit[1] in 2007 was 31% (FAO, 2010). Along with cereals, Nepal is also a net importer of other important items of food consumption such as fruits and vegetables. As of a percentage domestic production in 2007, net imports of fruits and vegetables were more than 8% and 2%, respectively (refer Figure 2.3b in Section 2 of report).

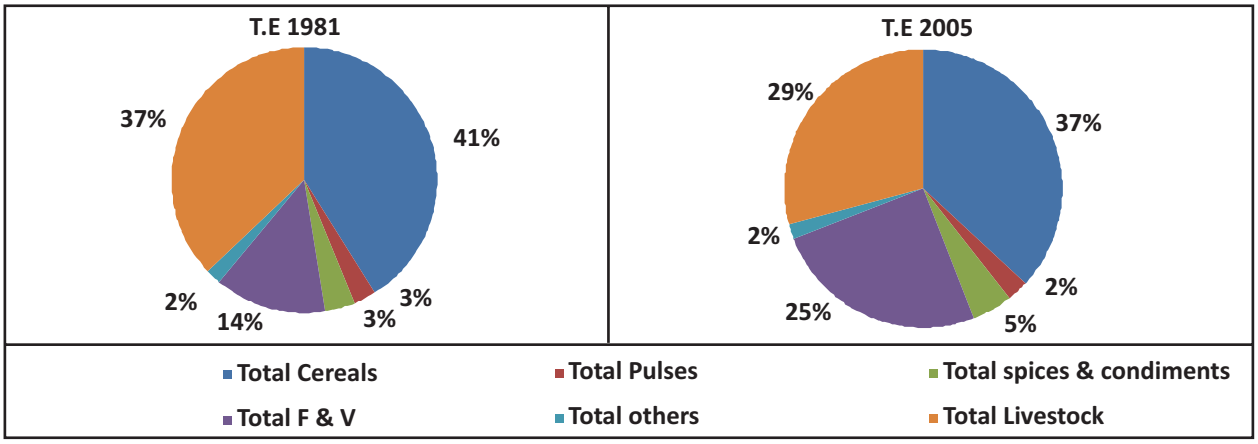
The past few decades have seen Nepalese agriculture diversifying towards high value segment (consisting of fruits, vegetables, spices & condiments and livestock products), which is good to augment farmers' incomes as also improve the nutrition content of the food basket. The share of fruits and vegetables to the overall value of output from agriculture, for e.g., has increased from less than 14% to nearly 25% while the cereal contribution has come down from 41% to 37% over T.E 1981 to T.E 2005 (Figure 3). But cereals are still the major crop occupying nearly 75% of the cropped area while the share of fruits and vegetables is only about 6.5% of the cropped area, indicating that the latter have a long way to go to make any significant impact on farmers' incomes and lives.

The total arable land area has more or less remained constant over the last two decades and largely concentrated in the *Terai* (refer section 2.4 in the report). Therefore, increasing land productivity is crucially important for agricultural growth. Investment in irrigation and rural roads will help improve land productivity. Nepal's natural advantage lies in its abundant water resources – both surface and ground water. However, less than 32% of the cultivated area is currently under irrigation. This suggests a huge opportunity to tap the potential of irrigation, which can help in raising and stabilizing yields of several crops.

Agricultural productivity is also constrained by the deficiencies in seed and fertilizer inputs. With the dependence on imports for improved seeds and fertilizer and Nepal's liberal trade regime the options for the government to provide support for these inputs is possibly limited. A number of donor-aided programs, for improved input supply and extension are underway - for instance, the long running SDC, USAID and CIMMYT supported Hill Maize Research Project. There is a need to upscale and extend the scope of such successful programs. To a large extent, the

[1] Food trade deficit in terms of (Food Import – Food Export)/Food Imports

Figure 3 Share of various sectors in value of output from agriculture and livestock



Source: FAO, 2010

functioning of input market is related to road connections, and how far the border with India remains "open" (especially in case of fertilizers which are highly subsidized in India).

On the output marketing front, public procurement and price interventions have reduced and the National Food Corporation is limited to a minimal role procuring less than 1% of the cereal production. Development of market linkages has been constrained by the lack of infrastructure, especially with regard to connectivity. Road density in Nepal is around 6.4 km/100 sq.km of area (DoR, 2007) while adjacent mountainous states in India – Uttarakhand and Himachal Pradesh have a road density of 133.6 and 58.5 km of roads/per 100 sq.km of area respectively (MoSRTH, GoI, 2007). Investment in irrigation and roads could boost agricultural-productivity. Section 2 delves deeper into issues surrounding availability, agriculture performance and constraints to enhancing agricultural productivity.

There is a pressing need to ramp up agricultural growth in Nepal – both for increasing domestic food supply and raising incomes. Although Nepal has achieved a higher rate of agricultural growth of 3.3% per annum during 2000-07 compared to other South Asian countries, yet this does not seem sufficient to arrest its falling self-sufficiency ratio in food production, as also to improve incomes in rural areas, alleviate poverty and improve nutrition levels of the masses. Given that the overall rate of growth of population in Nepal has remained rather high at 2.1% per annum (even after showing a decline from previous years) during the period 2001-07 (WB, 2010); agricultural growth has to be increased in order to translate this growth into raising per capita incomes.

Economic Access to Food and Nutritional Security

Poverty and poor incomes are a major constraint for households to achieve food and nutritional security. Though Nepal witnessed a significant reduction in the national poverty headcount rate, poverty remains high in certain regions especially rural western and mountain regions (although certain pockets of the *Terai* also fare badly). Moreover poverty remains concentrated amongst workers/households rooted in the agricultural sector- share of poor

in agriculture to total poor is around 77.8% in 2003/04. One of the possible reasons for this is that agriculture remains primarily subsistence based, thus generating little disposable incomes for dependent households. Because this sector employs over 70% of male and 90% of female workers (CBS, 2008) energizing and commercializing agricultural sector activities and boosting farm incomes are essential to reduce poverty and increase economic access.

So far much of the poverty reduction is said to be driven by out-migration of male labor, a resultant surge in remittances and rising real wages (WB, NPC, CBS, 2006). While recognizing the importance of remittances, the weak employment opportunities in the agricultural and non-farm sector remains an urgent challenge that needs to be countered. Since the share of women headed household has increased associated with migration (from 14% to 22% during 1998-2008), women workers in agriculture and the labor force as a whole are a critical target group for further interventions to promote both employment creation as well as agricultural dynamism.

As incomes have grown, food consumption patterns have changed towards high value items like fine rice, livestock and fishery products, fruits and vegetables, across income quintiles. The largest jumps have been in the livestock sector, especially poultry and fish consumption which have gone up by 100% and 47%, albeit from a very low base, and in potatoes where consumption has increased by over 30% between 1995/96 and 2003/04. Though the share of consumption expenditure on food has declined, the poorest quintile still spends up to 60% of household expenditure on food compared to the richest quintile which spends only 30%. Overall, an average Nepalese household spends about 39% of their expenditure on food (NRB, 2008), which is surprisingly lower than it is India, where the share of expenditure on food was around 52% in 2004/05 (GoI, 2006). Within Nepal however there are significant regional variations in food prices. For example, prices in the Mountain regions and west (where many of the poor reside) are somewhat higher than those in the *Terai* (refer Section 3.3 for further discussion).

Two critical policy considerations here are arriving at ways to increase food supply to these areas and devising ways to stabilize prices across regions. While food distribution safety nets may be playing a critical role in some regions to lessen the food price burden on families, its impacts still seem to be minimal as Nepal does not have a well integrated and large scale program in place. This holds true also for other initiatives like employment and income generation programs. Section 3 looks at issues of poverty, employment and incomes and consumption/prices and safety nets in detail.

Absorption and Utilization for Food and Nutritional Security

While child mortality rate has decreased from 85 to 51 deaths per thousand from 2000 to 2008 in Nepal reflecting improvements in health outcomes, under-nutrition remains a challenge. Share of children under 5 years who suffer from stunting (low height for age) has decreased by only 13% during 2001-06 and still remains at 49% (Figure 4). The western and Mountain regions seem to be lagging and rural areas have seen lower reduction than urban levels (declining by 0.8% and 1.6% respectively). Micronutrient deficiencies in these areas are also higher. For instance in the case of anemia, 51% of the women suffered from some kind of anemia in the far-western regions against 31% in the eastern region.

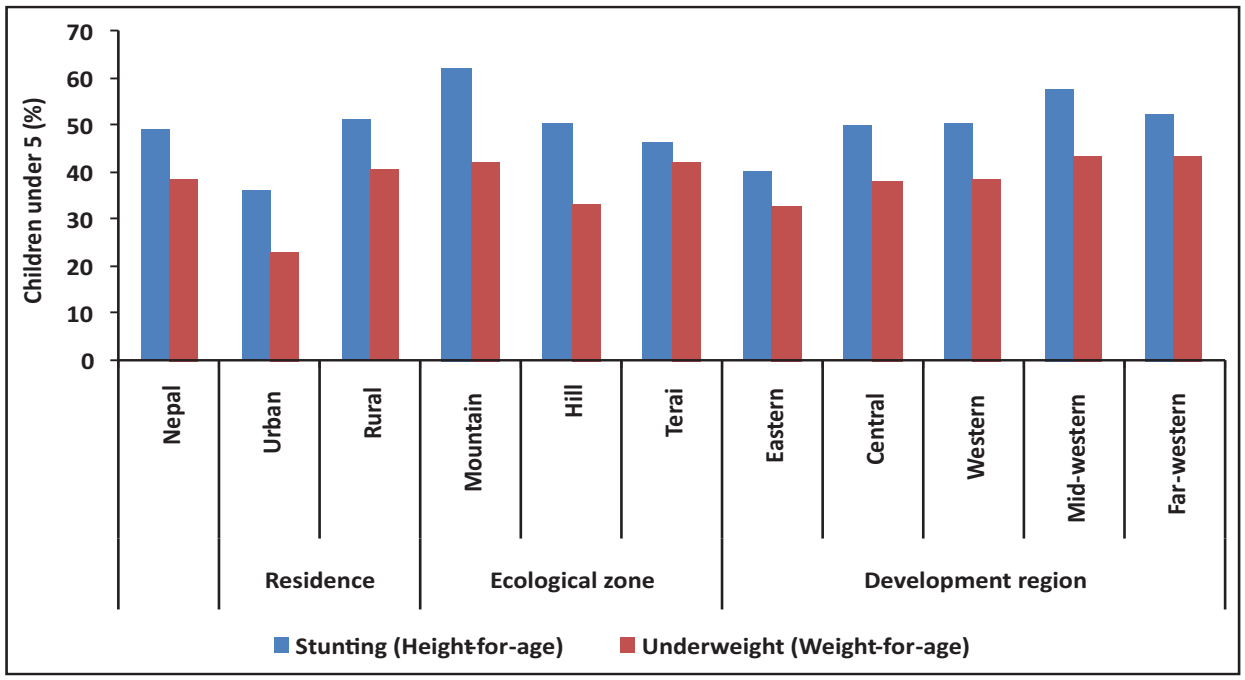
Nutrition outcomes not only reflects calorie consumption, but also a set of absorption and utilization factors such as access to quality healthcare, water supply and sanitation, educational attainment that enable households to take right food and nutritional decisions as well as food safety laws and practices.

It must be noted that in most of the regions with high malnutrition levels, educational indicators and literacy seem to be very low especially amongst women. Even in 2003/04 literacy rates amongst women in the *Terai* belt was only 45%, while it was much lower in the Mountain and Hill regions (32% and 35% respectively). Various studies across countries have demonstrated that women's literacy is a crucial factor contributing to reduction in malnutrition among children. It is necessary for Nepal to raise enrollment and retention of girls in school. Nepal has been showing relatively good progress on increasing health care facilities and has also met with reasonable success with regard to some nutritional interventions such as the long running Vitamin A supplementation program. While a number of programs are underway, many of them being donor funded, a rigorous evaluation of these schemes is necessary to understand their operations and evaluate the efficiency and effectiveness in actually reducing the malnutrition burden amongst the population. Section 4 briefly examines the various absorption and utilization factors and constraints for nutritional security in Nepal.

Gender and Governance

Various aspects of Nepal's changing social and economic scenario require that gender concerns be at the forefront of discussions surrounding food and nutritional security. These aspects include

Figure 4 Share of undernourished children under age 5 across regions of Nepal



Source: NDHS, 2006

- migration and related feminization of agriculture and labor, female literacy and its importance for nutritional and food security at the household level etc. Addressing these concerns requires interventions aimed at reforming of agricultural supporting institutions such as credit & extension to serve specific needs and requirements of women headed farm households, designing appropriate marketing institutions and also focusing on women literacy as well as programs aimed at inculcating awareness of health and nutrition issues and safe practices among women.

Governance issues are important at two levels. Firstly, of concern, is the overall governance climate in Nepal, which is experiencing a transition as the nation moves towards a fully fledged constitutional republic. A stable political and governance framework is important for maintaining a climate which is conducive for private investment. At the second level it is also crucial to examine issues of governance related to policy formulation and program implementation – the operational issues of good governance.

Linkages and Synergies between Agriculture, Poverty and Nutritional Outcomes

Income and access to food is an important contributing factor to influence nutritional outcomes aside from various biological factors and other practices like child feeding, availability of health services, women education, and so on. In the lowest wealth quintile category, 61.6% and 47% of the children below the age of 5 were stunted and underweight respectively. Similarly among the lowest quintile, 72.5% of the women were underweight compared to 64.3% in the highest quintile (NDHS, 2006). This is partly because household wealth influences various factors from educational attainment to quality of food intake and dietary diversity as well as access to quality healthcare facilities and safe drinking water. For instance, 45.7% and 44.6% of women in the highest wealth quintile consumed milk and meat/fish while among the lowest quintile the corresponding percentages were 24.2 and 23.2 respectively (ibid). A preliminary effort to find the relation between agriculture, poverty, absorption factors and nutritional outcomes was undertaken in this study.

First a malnutrition index based on available anthropometric indicators, namely the share of children under 5 years of age who suffer from stunting, wasting and underweight and share of women (aged 15-49 years) classified as thin (with BMI< 18.5 kg/m2) was constructed. Each percentage value is normalized using the formula:

$$Normalized\ \ Indicator = \frac{Actual\ \ Value - Min\ \ Value}{(Max\ \ Value - Min\ \ Value)}$$

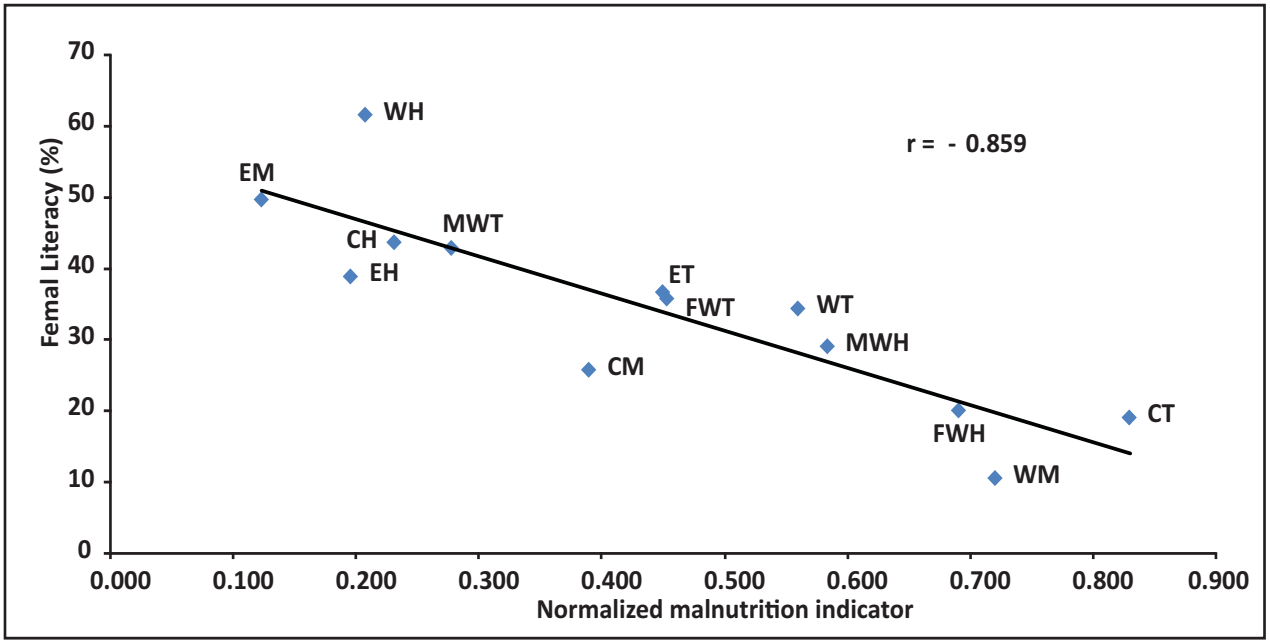
The simple average of these 4 normalized figures is taken to arrive at the Normalized Malnutrition Index or NMI. Surprisingly, the relation between malnutrition and agricultural income seems weak, which is unlike the relationship observed in India (Gulati et al 2010) and requires further investigation. However, the preliminary results show a strong negative relation between women's literacy and the level of malnutrition (with a correlation coefficient of -0.859, Figure 5). In order to investigate the determinants and factors influencing nutritional outcomes, more detailed data and further analysis is needed. The details and initial findings of the preliminary investigation carried out are presented in Section 6.

Way Ahead

The analysis carried out in this stocktaking exercise explores the major issues and challenges facing Nepal to better food and nutritional security. They include improving agricultural performance and productivity, generating income growth and tackling malnutrition, issues related to gender and the role of women and those related to governance and regional access.

From a policy perspective, it is critical to recognize that the open border with India affects agricultural profitability in general in Nepal – both with regard to output price and also due to the country's dependency on imported inputs. On the output side, Nepal currently does not have a strong set of institutions to offer price support to its farmers, and in any case the experience of several other countries shows that such policies often distort the incentive structure across crops with several undesirable side-effects. Input subsidization policies is unlikely to be a sustainable option either as the country is fully / almost fully dependent on imports and also due to the weak fiscal situation of the country. Under these circumstances, Nepal's options could be to pursue policies aimed at improving farm productivity in general without directly intervening in particular commodity output or input markets. From that point of view, investment in basic infrastructure for agriculture such as roads to improve connectivity of input and output markets, irrigation and power to raise productivity is critically important. But agricultural growth, which may be critically important, may not be sufficient condition to improve child nutrition. For that, Nepal will have to invest in female education, general sanitation, basic health care, and some selected direct nutrition interventions.

Figure 5 Female literacy and malnutrition (NMI) across sub-regions of Nepal



Source: NDHS, 2001 and Authors' calculations

Some possible investment options and directions have been identified in this report in Section 7. With regard to improving agricultural performance, these options include focusing on physical and marketing infrastructure and strategies to improve agricultural inputs availability and usage. In order to address the access and absorption scenario, some investment options are sustainable employment generation especially in the rural non-farm sector, an evaluation of existing safety nets and scaling up of successful interventions, extending quality education and health facilities to remote areas etc. Tables 7.1, 7.2 and 7.3 in Section 7 of the report outline the broad possible investment options in the short-, medium-, and long-term for tackling issues of availability, access and absorption respectively. It must be cautioned however that these options are based on very preliminary exercise undertaken in this report, and more research is required to develop them into more robust investment options.

The food and nutritional security interventions to improve availability, access and absorption are cross-cutting in nature and would involve multiple stakeholders. Coordination and partnerships need to be forged between the government, bilateral and multilateral donors, private sector, civil society bodies, and the communities themselves. Actual investment strategies have to be based on a rigorous assessment of the costs and benefits over the short-, medium- and long-run. Here knowledge partners – both national and international – can play a critical role in ensuring that optimal investment strategies are arrived at, and the programs are well designed with clearly laid out indicators for outcome monitoring. In order to do so, there is a need for research to bridge several existing knowledge gaps such as the following;

- From the perspective of strategizing overall investments, an analysis of the marginal rates of return (in terms of growth impact and poverty reduction) to various investment options- like roads, irrigation etc. needs to be carried out.

- With regard to enhancing agricultural performance some of the focus areas where research is required include – value chain studies, constraints to irrigation extension, options for improving land productivity, issues related to gender specific constraints in agriculture and evaluating possible impacts of emerging challenges such as climate change.

- Addressing issues of access and absorption requires greater in-depth examination of questions related to targeting and delivery of food safety nets and food management policies; understanding the socio-economic impacts of migration; also of importance is the need for rigorous, independent evaluation of various health & nutrition interventions as well as examining questions related to role of women's literacy, health facilities and infrastructure and food safety for ensuring food and nutritional security.

The above list of issues is by no means exhaustive. But these are some of the glaring knowledge gaps that need to be filled for effective policy response to improve food and nutritional security in Nepal.

Nepal's highly varied topography – plains, hills and mountains – is its ecological wealth and economic challenge

1 Introduction

1.1 Background: Nepal vis-à-vis other South Asian Countries

Nepal is a landlocked country bordered by India to it's the south, east, and west and China on the north (Figure 1.1). It has a population of approximately 28 million spread over an area of 147,181 sq. km (CBS, 2006) with a rich diversity of ethnicities and culture. Nepal is also characterized by a highly varied topography ranging from the fertile plains (*Terai*) in the south to the Mountainous region in the north which is home to eight of the world's ten

Figure 1.1 South Asia and Nepal

Map No. 4304 UNITED NATIONS
January 2007 (Colour)

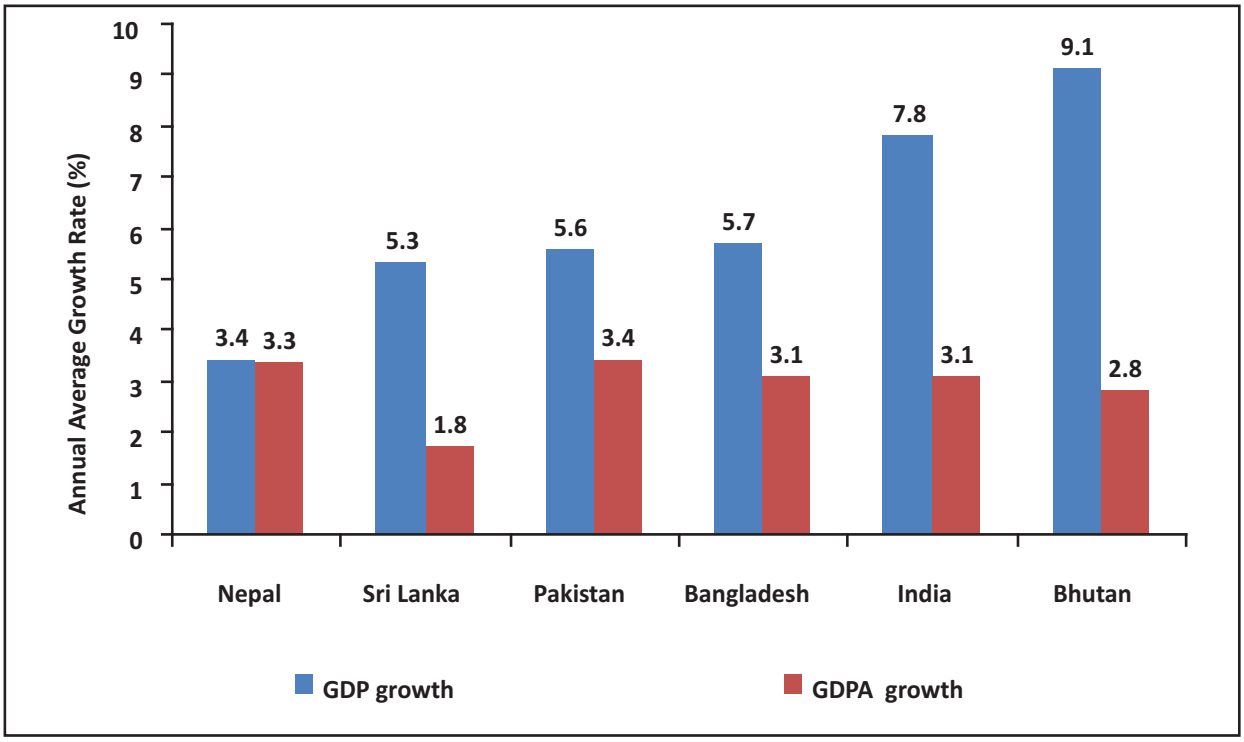
Department of Peacekeeping Operations
Cartographic Section

Source: UN, 2007

highest Mountain peaks. Such dramatic contrasts in geography make Nepal a nation of scenic landscapes with a wealth of ecological and biodiversity resources.

Even more dramatic, in socio-economic terms, has been Nepal's achievement in the rate of poverty reduction – in the period 1995/96 to 2003/04 Nepal poverty headcount ratio (PHCR) reduced from 41.8% to 30.9% translating to a poverty reduction rate of 1.4% per annum (in terms of percentage point reduction) which is the highest among all the South Asian countries. In the more recent period (2000-07) its agricultural performance has been one of the highest among the South Asian countries, with the gross domestic product from agriculture and allied sectors (GDPA) showing a growth of 3.3% (Figure 1.2). On the other hand, Nepal's overall economic growth rate in gross domestic product (GDP) per annum was seen to be lagging behind the rest of the countries in South Asia at 3.4%. The close movement of GDP and GDPA also brings out an important aspect of Nepal's economy – the overall Nepalese economy's dependence on agriculture. In 2008/09 nearly 34% of the GDP was from agriculture and allied sectors (including forestry and fishery), and this sector employs nearly 70% of the total workforce (MoF, 2009). The high rate of agricultural growth, though volatile, is nevertheless commendable, viewed in light of the considerable internal challenges and unstable political situation that Nepal has faced in recent years. However, on the other hand, the population growth rate in Nepal is among the highest in the South Asian countries – with an average annual growth rate of almost 2.1% during the period 2001-08 (refer Figure

Figure 1.2 Gross Domestic Product (GDP) and Gross Domestic Product from agriculture & allied (GDPA): average annual growth rates (2000-07)



Source: WB, 2010. Note: Arranged in increasing order of GDP growth

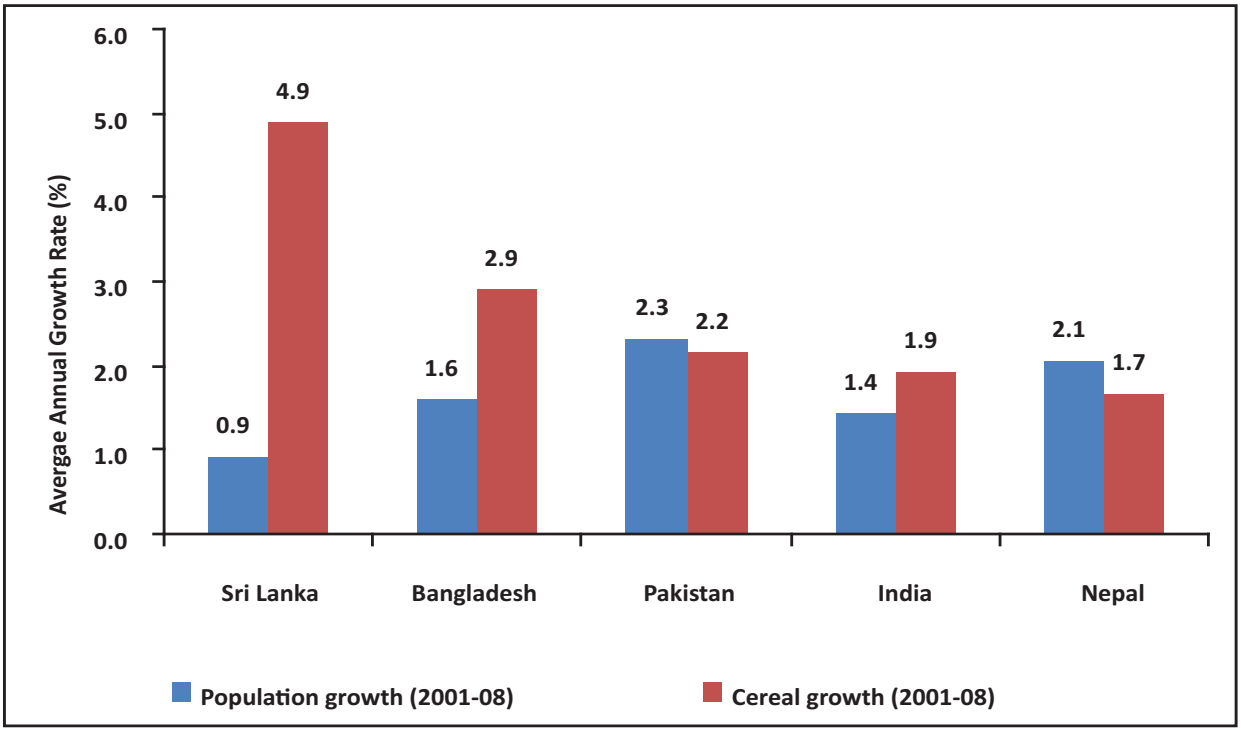
1.3)[1]. This implies that the gains from the high agricultural growth, may not translate into a similar augmentation in per capita income levels. Improving agricultural productivity and value, is therefore, crucial for boosting per capita income.

While Nepal has certainly seen some positives it still faces many challenges on the social, economic and political fronts. Nepal's human development index (HDI) in 2007 was estimated to be 0.553, giving it a low ranking of 144 out 182 countries (UNDP, 2009). It is also among the least developed countries of the world[2] and food and nutritional security is one of the key problems that Nepal faces.

Critically, Nepal is the only country in South Asia wherein the population growth rate is higher than the cereal production growth rate (Figure 1.3). Consequently Nepal's domestic production has not been able to fulfill local demand and Nepal has been a net importer of cereals since the 1980s.

Productivity of cereals in Nepal is also low with yields for major cereals being one of the lowest in the region. Paddy, which is the major staple cereal in Nepal and accounts for 35% of the cropped area in the country, has the lowest yields in the region of around 2700 kg/ha in

Figure 1.3 Average annual growth rates of population and cereal physical production in South Asian countries



Sources: 1. Cereal production data FAO, 2010 2. Population data WB, 2010

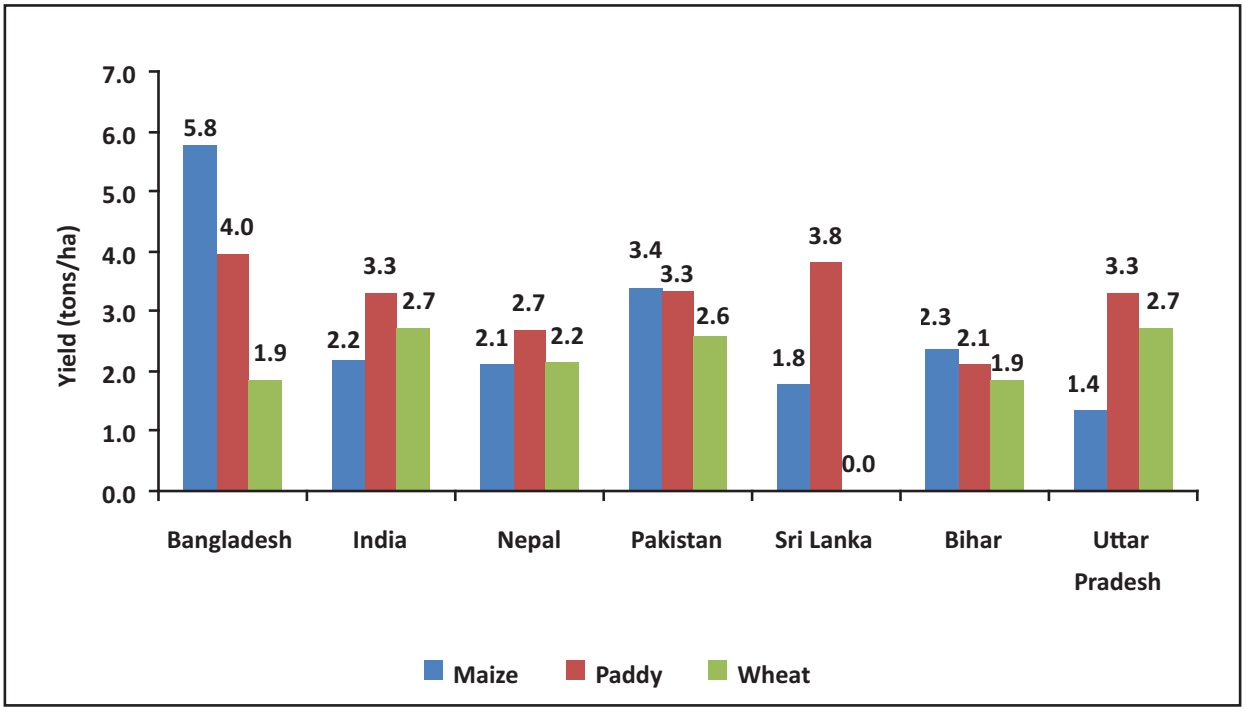
[1] Population growth rate based on estimated population figures from WB, 2010

[2] Least Developed Countries (LDCs)- 49 countries as classified by UN (http://www.un.org/esa/policy/devplan/profile/ldc_list.pdf)

triennium ending (TE) 2008[3]. In comparison Bangladesh's paddy yields are around 4000 kg/ha (TE 2008). With respect to wheat and maize Nepal's yield levels are slightly better. Wheat yield is around 2150 kg/ha – Pakistan and India have higher yields of 2562 and 2710 kg/ha respectively (TE 2008). In maize Nepal's yield levels of around 2100 kg/ha are far lower than Bangladesh's maize yields which are around 5770 kg/ha, but not too far behind the average Indian maize yield level of 2190 kg/ha (TE 2008).

Yield levels of cereals in Nepal, however, are comparable to the yields in the four neighboring states of India – Himachal Pradesh, Uttarakhand, Uttar Pradesh and Bihar – that border Nepal and have comparable agro-climatic, topographic conditions and agricultural characteristics, especially in the case of paddy.[4] The average yield of paddy (TE 2008) in these four Indian states is around 2800 kg/ha with Bihar exhibiting a lower yield of 2100 kg/ha (MoA,GoI, various issues), compared to Nepal's 2700 kg/ha. In the case of wheat and maize, Nepal shows higher yield levels in comparison to average yield across these four states. Yields of wheat and maize in the four neighboring states in TE 2008 were 2011 kg/ha and 1860 kg/ha respectively compared to the corresponding figures of 2150 and 2100 kg/ha in Nepal. Figure 1.4 shows the comparative yield levels across South Asian countries and the Indian states of Uttar Pradesh and Bihar for maize, paddy and wheat.

Figure 1.4 Comparison of cereal yields across South Asian countries and some states of India (TE 2008)



Source: FAO, 2010 for country level yields & .MoA, GoI (various years) for yields of Indian states

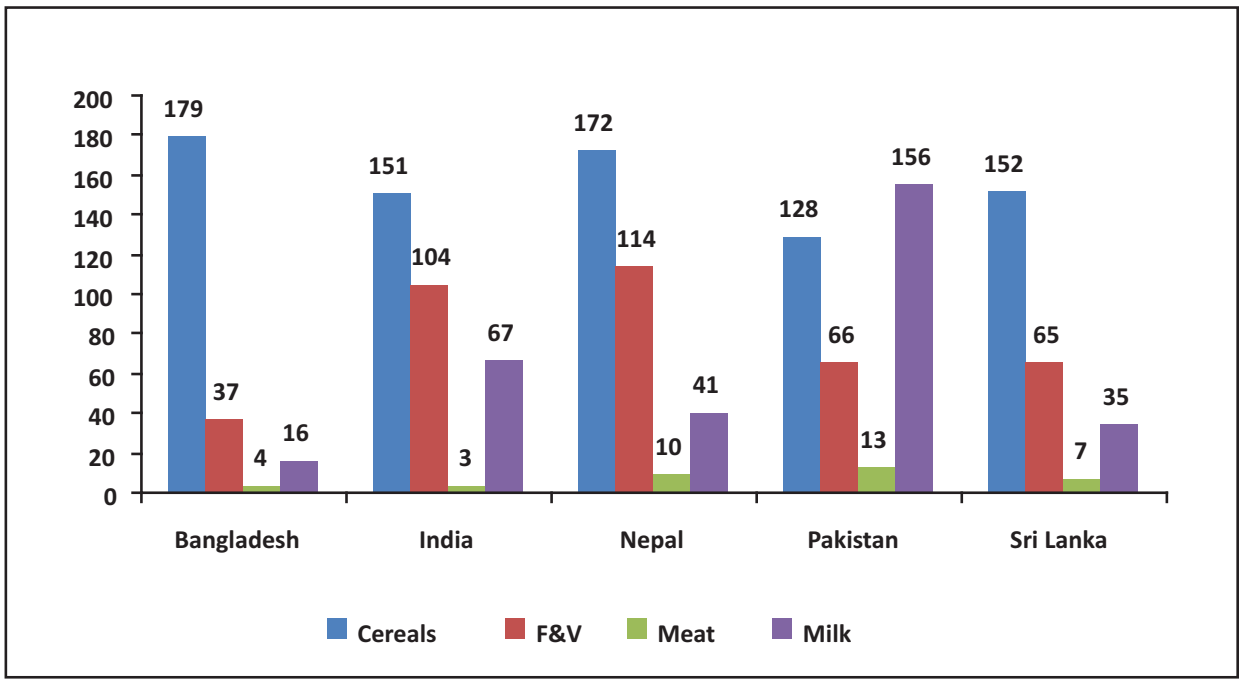
[3] Yield data for comparison across countries has been obtained from FAOSTAT (FAO, 2010)

[4] The agro-ecological and topographic conditions in Bihar and Uttar Pradesh are similar to the *Terai* region in Nepal, while the conditions in Himachal Pradesh and Uttarakhand are similar to the Hills and Mountains of Nepal. Besides, an important aspect of agriculture in the four Indian states is the low input use as in Nepal.

But domestic agriculture production is only one of the factors affecting the availability aspect of food security. Overall food availability would depend on domestic production as well as on food trade, food stocks and also upon food aid. When per capita cereal supply (kg/capita/year) is compared across South Asian countries (Figure 1.5) it is interesting to note that Nepal fares relatively better with availability levels being second only to Bangladesh in recent years. Net availability of fruits & vegetables (F & V) is highest in Nepal in the region, while in the case of meat products it is second highest, and in case of milk Nepal is placed somewhere in the middle. The case of cereals in particular is interesting. Even though domestic cereal production in Nepal does not seem to have kept pace with the population growth rate availability is among the highest in the region. This suggests that food imports and/or food aid plays an important role in boosting the food availability in the country. The possible importance and impact that food trade plays in Nepal's food security situation is examined to some extent later in this report.

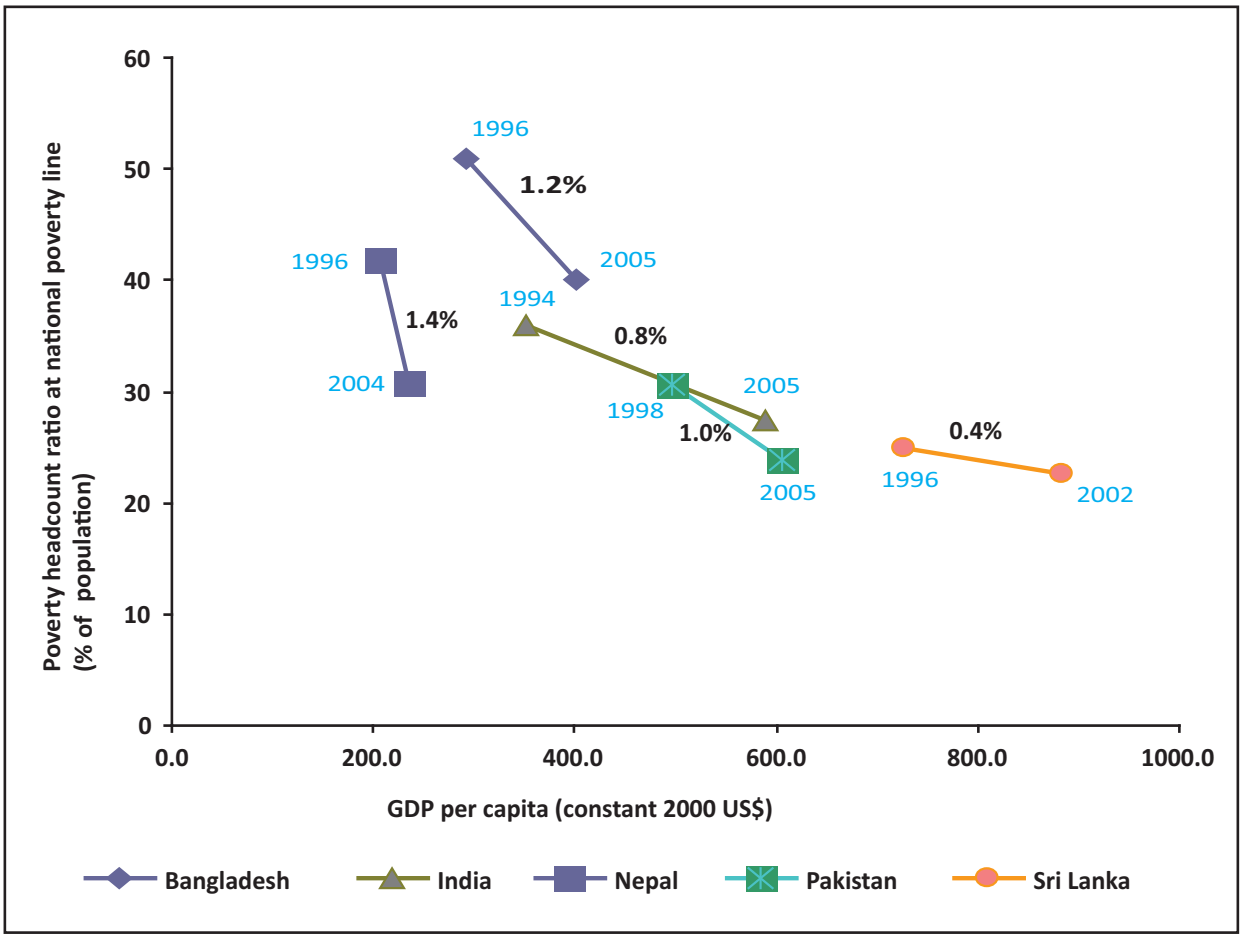
Access, especially economic access, to food by the populace is another critical aspect of food security. As mentioned earlier Nepal witnessed the highest rate of poverty reduction among South Asian countries at 3.7% per annum in 1996-2004, or at the rate of 1.4% per annum in terms of percentage point reduction (Figure 1.6). However, during this period the per capita income (GDP per capita in constant 2000 US$) grew by less than 14% from $206.5 to $235. In comparison Bangladesh and Pakistan which saw a poverty reduction rate of 1.2% and 1.0% (in terms of percentage point reduction in poverty head count ratio per annum)

Figure 1.5 Per capita availability of cereals, fruits & vegetables (F&V), meat products and milk in South Asian countries (kg/capita/year) (TE 2007)



Source: FAO, 2009. Note: Corresponding figures were unavailable for Bhutan.

Figure 1.6 Change in poverty headcount ratio (at national poverty line) and GDP per capita (constant 2000 US $) for South Asian countries (across differing periods)



Source: GDP per capita for all countries and PHCR for all except Pakistan from WB, 2010; Pakistan PHCR data from MoF, GoP, 2010. Note: i. Numbers along the slope (in bold) indicate the annual poverty reduction rate in terms of percentage point reduction per year during the period (between the years marked on the vertices) for the respective countries. ii. Poverty estimates for Bhutan are available only for one year and hence not included here

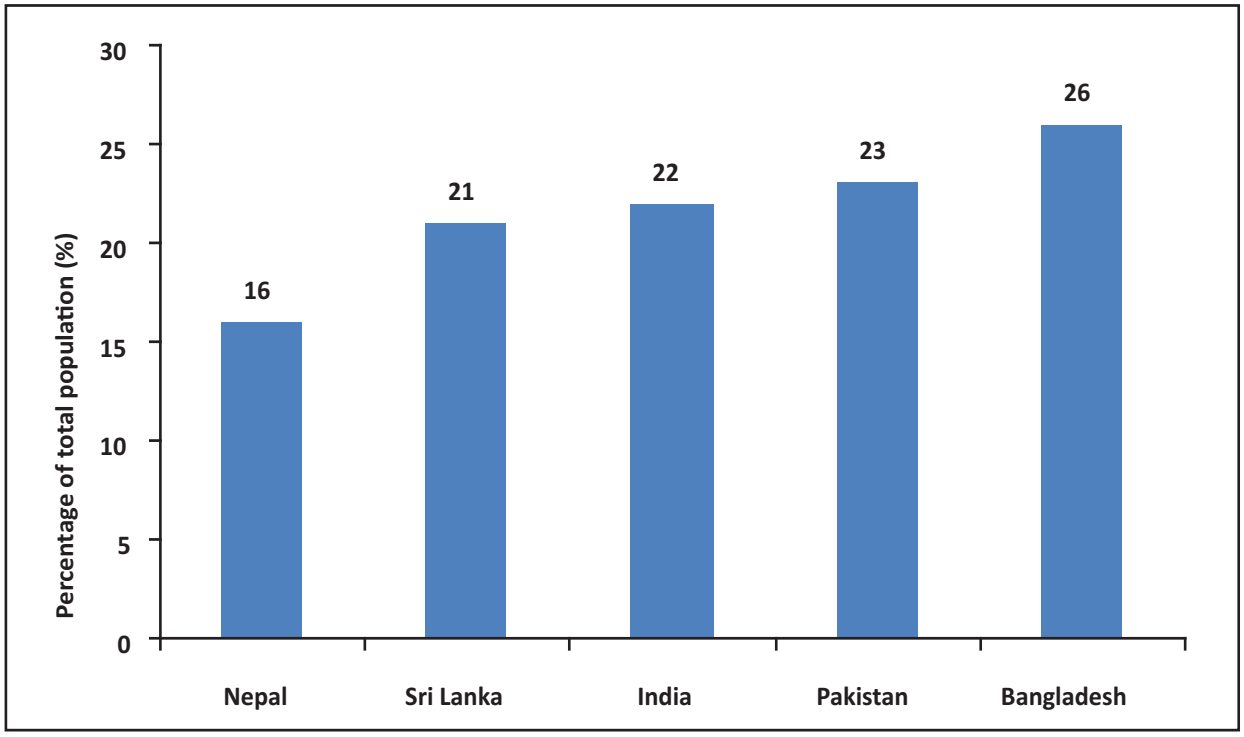
respectively (over different periods of time) saw an income rise of 37% and 22% respectively. Income levels in Nepal are by far the lowest among the South Asian countries. GDP per capita in 2008 (in terms of constant 2000 US $) was $ 254, a little more than one-fifth of Bhutan which was $ 1247 (World Bank, 2010). Even if Nepal has high per capita cereal supply, the low income levels could well be a constraint for adequate food consumption by a large section of the population.

Access to food along with food utilization factors such as quality of food consumed, nutritional balance, health and hygiene factors, sanitation factors etc. would lead to the observable/measurable food and nutritional security outcomes.

One measure of food security is level of food deprivation as measured by FAO's estimates of prevalence of undernourishment[5]. A comparison across South Asian countries based on this measure shows that Nepal is at a relatively better situation compared to rest of the countries in the region (Figure 1.7). 16% of Nepal's population is estimated to be undernourished or unable to meet their minimum dietary requirements while it is much higher in the other countries with Bangladesh being the highest at 26% (FAO, 2010).

However, examining Nepal's anthropometric nutritional indicators vis-à-vis the other South Asian countries shows that lower prevalence of undernourishment does not necessarily translate to better nutritional outcomes for children. Nepal has the highest percentage of children who are stunted, with almost 50%, of children less than five years of age categorized as being stunted. The prevalence of underweight children below age five is also relatively high at 40% (WB, 2010). The outcomes in the form of anthropometric nutritional indicators would be mediated by a host of factors other than just the intake of food. The section on absorption and nutritional outcomes looks at these in detail for Nepal. Also the national average does not reveal the significant inter-regional variations that exist within Nepal. These variations in nutritional indicators within Nepal are also briefly examined later in this report.

Figure 1.7 Prevalence of undernourishment* (%) 2004-06



Source: FAO, 2009 Note: * the minimum dietary energy requirements (DER) for the various countries in kcal/person/day are: Nepal -1760, Sri Lanka – 1810, India – 1770, Pakistan – 1750 and Bangladesh – 1750.

[5] FAO country-wise prevalence of undernourishment estimates are based upon food supply available for human consumption computed from food balance sheets of respective countries, consumption expenditure from household budget surveys and a minimum dietary requirement norm. Details of the methodology can be obtained from the following URL: http://www.fao.org/fileadmin/templates/ess/documents/food_security_statistics/metadata/undernourishment_methodology.pdf

1.2 Food and Nutritional Security: Framework for Study and Objectives

This report attempts to present an overview of the current status and key challenges, constraints facing Nepal in relation to Food and Nutritional Security. It is meant as a stocktaking exercise of the current situation and not aimed at any final policy recommendations. Rather, the emphasis here is on identifying gaps in knowledge related to food and nutritional security in Nepal which must be addressed through evidence based research in order to facilitate better and rational policy making. This report does, however, attempts to outline a broad set of short, medium and long term investment options and directions. These are based on the preliminary analysis emerging from the stocktaking exercise, and would necessarily require further research on the associated costs and benefits before they can be developed into full fledged investment plans and policies.

The State of Food Insecurity, 2001 (FAO) defines food security as *"a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".*

Following the above definition of food security the framework for analyzing food and nutritional security identifies three interlinked themes – availability, accessibility and absorption (Figure 1.8). These three A's of food and nutritional security are defined thus:

'Availability' pertains to availability of food at the national level comprising food from domestic production, net food trade, carryover stocks and food-aid. Evaluation of this aspect of food and nutritional security requires an examination of domestic production trends, food trade trends, structure and performance of agriculture and the constraints to growth in domestic agricultural sector.

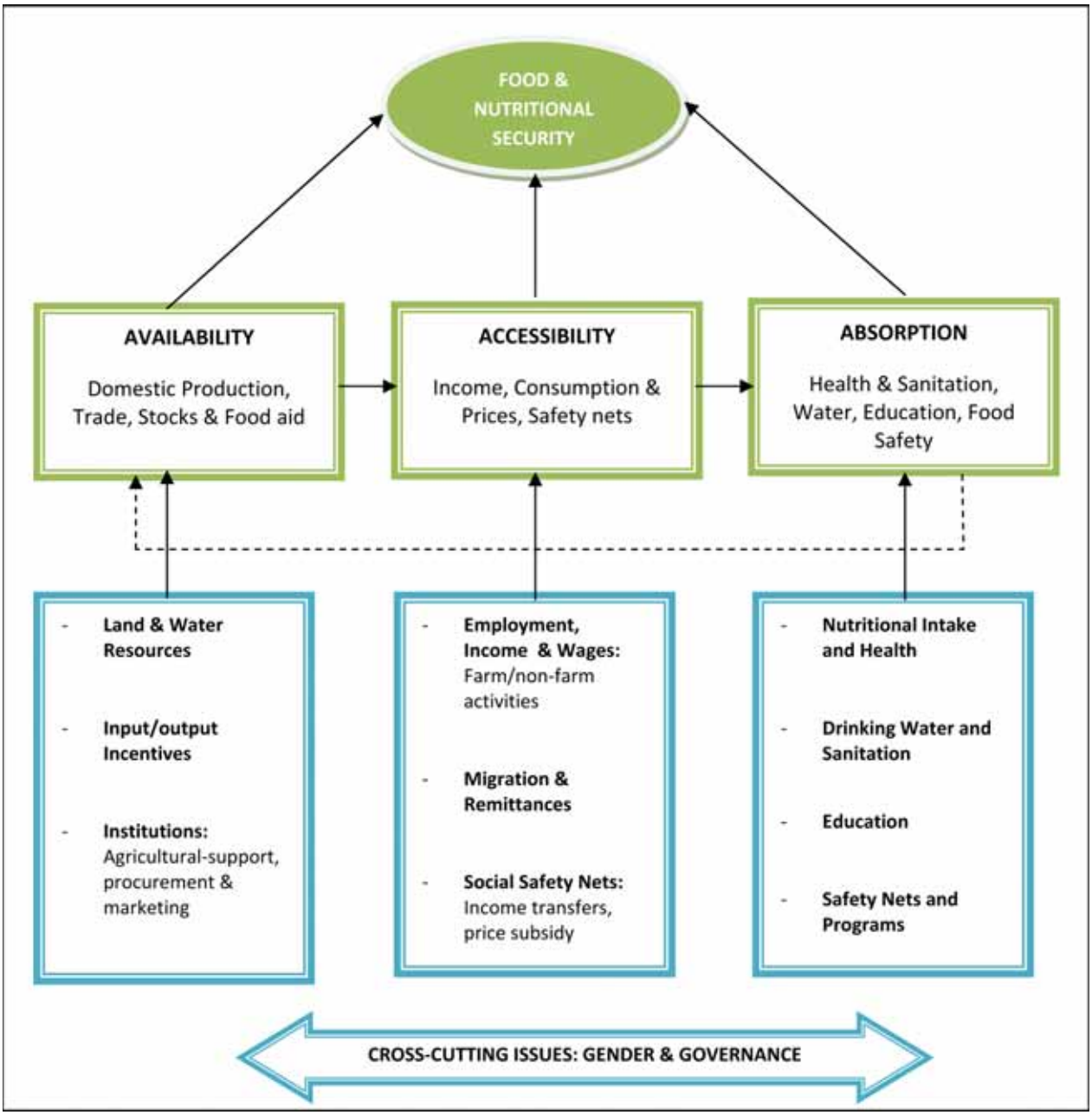
'Access' broadly refers to the ability to accessibility of food by households and individuals. Factors determining access include income and consumption levels, prices and affordability and safety nets programs or schemes if any.

'Absorption' covers those factors which are required for ensuring that food availability and access translates into nutritional security. These include adequate nutritional intake, health and sanitation infrastructure, education etc.

This report examines all these three aspects of food and nutrition security in Nepal and is organized around the framework outlined above. Section 2 examines the food supply and availability scenario. It presents an overview of the performance, challenges and constraints to growth of Nepalese agriculture and looks at agriculture production, inputs and prices landscape, agricultural marketing and trade. Section 3 deals with issues of access to food. In this section poverty reduction, employment and income structure and trends are examined. From the demand side it looks at aspects of food consumption patterns and food price movements. Section 4 briefly discusses the status and constraints on the absorption/utilization front. Trends in nutritional, health and educational outcomes are first considered followed by an overview of challenges related to access and utilization of health, sanitation and educational

facilities in Nepal. Section 5 looks at the issues of gender and governance which are cross-cutting in nature and affect all three A's of food security. The subsequent section of the report explores the linkages between poverty, agriculture and nutritional outcomes and presents some preliminary results from the investigation. The last section presents the conclusions and the way forward.

Figure 1.8 Framework to study food and nutritional security in Nepal



Source: Authors

The fast growing vegetables sub-sector generates employment, income and also contributes to better nutrition

2 | Food & Nutritional Security: Availability Scenario

- Nepal's GDP from agriculture has been showing one of the highest growth rates in South Asia of 3.3% during the period 2001-07, but GDP growth has been the lowest at 3.4% in the same period.
- Net imports of cereals, fruits and vegetables show a steep increase in recent years.
- Cereal yields are low and the production growth rate have also been lagging, especially paddy and wheat (1.7% and 1.9% in 2000/01-2008/09).
- High value sector shows a much higher growth rate with vegetables growing at 7.0% per annum, fruits at 4.2% and milk and meat at slightly lower rates of 3.1% and 2.8% respectively (for the period 2000/01-2008/09).
- Agricultural input usage is very low – improved seeds and fertilizer supply is problematic with high import dependence, while irrigation spread has been limited despite abundant availability of water resources.
- Private traders dominate the agricultural markets but output linkages are constrained by a lack of basic infrastructure.

2.1 Nepal at a Glance

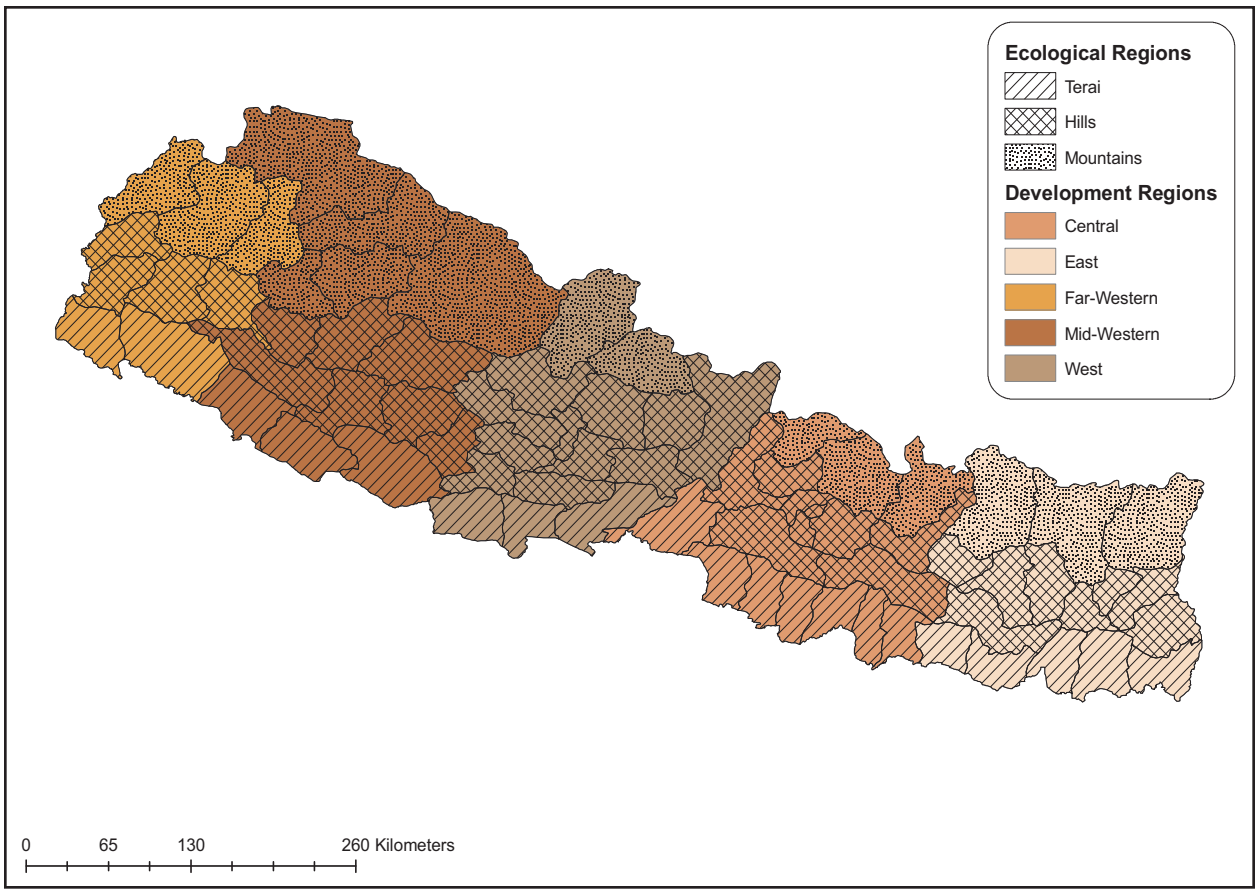
Ecologically and geographically Nepal's landmass broadly falls into three zones – the *Terai*[1], the Hills and the Mountains (Figure 2.1). Administratively Nepal has 75 districts with 3915 Village Development Committees and 58 Municipalities. The 75 districts are spread over five development regions - Far-Western, Mid-Western, Western, Central and Eastern regions though these regions are not functional administrative units.

Majority of the land (geographical area) in Nepal falls in the Hills and Mountain regions with a share of 42% and 35%, respectively, while the *Terai* accounts for only 23% of the total land (Table 2.1) (MoAC, 2009).

The spatial spread of population on the other hand shows a high concentration in the *Terai* belt. According to the 2001 census, the thin strip of *Terai* accounted for 48.4% of the population and the Hills accommodated 44.3% of the population. This is reflected in the population density

[1] *Terai* literally translates to 'moist land' or 'footHills' refers to the strip of plains at the foot Hills of the Himalayas

Figure 2.1 Ecological zones, development regions and districts in Nepal



Source: Authors

which is the highest in the *Terai* at 330 persons/sq.km while it goes down to 32.6 persons/sq.km in the sparsely populated Mountain region. The rate of growth in population is also much higher in the *Terai* region as evidenced in its increasing share of population with respect to the other regions – increasing from 36.4% of the population in 1961 to 48.4% in the last census in 2001 (CBS, 2003a). From 1991 to 2001 the population in *Terai* grew at a compounded average growth rate (CAGR) of 2.7% while the Hill and Mountain region witnesses a growth rate of 2% and 1.6%, respectively, translating to an overall population growth rate of 2.3% for Nepal in this period.

Table 2.1 Distribution of land and population across ecological regions of Nepal

Ecological Region	Share of total geographical area (%)	Share of total population (%)
Terai	23%	48.4%
Hills	42%	44.3%
Mountains	35%	7.3%

Source: Geographical area from MoAC(2009) and CBS, 2003a for population figures

2.2 Food Availability Status

Nepal cereal production growth, as mentioned earlier, has been outpaced by the population growth. In fact population growth rate has been higher than the cereal production growth rate since the 1960s. A comparison of average annual growth rates across decades of population and

cereal production (Table 2.2) show that the only decade in which the cereal production growth rate was higher than population rate of growth was in the period 1981-90. Interestingly this was also the period which roughly corresponds to the time when Nepal became a consistent importer of cereals (Figure 2.2a). Over the succeeding periods cereal production growth rates have been declining. Population growth has shown a reduction only in the last period 2001-08 but is still higher than the cereal rate of growth and value of net cereal imports shows an increasing trend in this period. It also appears that Nepal has become a net importer of fruits and vegetables (F & V) from mid 1990s onwards (Figure 2.2b). This indicates that the demand for F & V has been increasing in Nepal, but the growth in domestic production has not been able to match this demand. There seems to be a steeper rise in imports and a noticeable fall in exports of cereals and F&V in the more recent years, especially from 2000 onwards. Although this period roughly corresponds to the time of civil unrest in Nepal, deeper analysis is required before concluding if there is any direct link between the trend seen in ago export/imports and the domestic political situation in Nepal.

Table 2.2 Annual average growth rates for population and cereals in Nepal (%)

Years	Cereals	Population
1961-70	1.3	2
1971-80	1.0	2.4
1981-90	5.3	2.4
1991-00	2.3	2.5
2001-08	1.7	2.1

Source: FAO, 2010 & WB, 2010

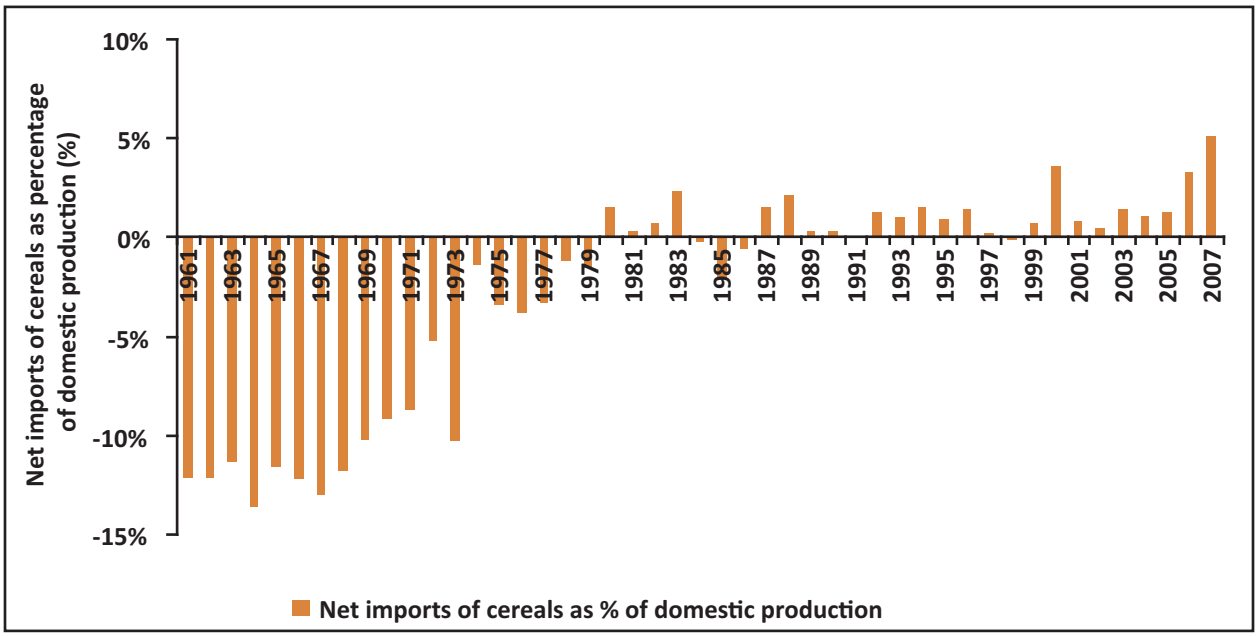
While Nepal's domestic production of cereals on the whole has not been keeping up with the population growth in the country its per capita cereal availability does not show any decline and has in fact hovered around 170 kg/capita/year since the 1990s, the highest behind Bangladesh in recent years in the South Asia region (FAO, 2010). Cereal imports are possibly the reason for maintaining a high availability thanks to Nepal's liberal trade regime. Nepal's agricultural tariffs were the lowest in South Asia by 2002, with no tariffs on staples and no quantitative restrictions on agricultural products (Pyakuryal, Roy, & Thapa, 2010). Though cereal imports have certainly increased, Nepal's import dependency ratio was not very alarming reaching up to only 3.5% of total domestic availability in 2007 (refer Annex Figure 2A.1 in Annex for details). In terms of value fruits and vegetables form a larger share of Nepal's imports than cereals with F & V comprising 22.8% of total agricultural-imports in TE 2007. Nepal's agricultural-exports on the other hand are dominated by processed oils (33.8%) and beverages & tobacco (15.6%) in TE 2007 (Figure 2.3 a & b).

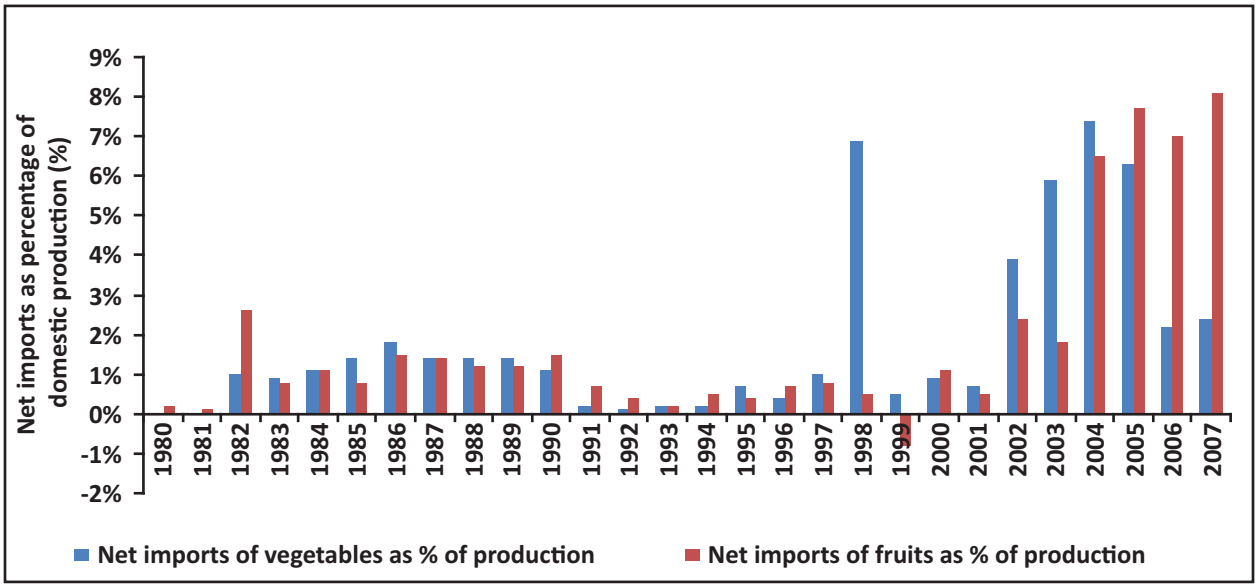
2.3 Nepal's Agricultural Structure and Performance

Nepal's GDP from agriculture (GDPA), as seen earlier, has shown a relatively higher growth rate compared to its South Asian neighbors (during the period from 2001-07). However both the GDP and the GDPA in Nepal show high fluctuation. The co-efficient of variation (CV) of the annual growth rates of GDP and GDPA were 0.4 and 0.5 respectively for the period 2001-09 (Figure 2.4), but in general the GDP and GDPA seem to be showing a similar trend indicating the extent to which the agricultural sector influences Nepal's overall economy.

To understand better the performance of the agricultural sector this section examines the trends in the main sub-sectors of agriculture in Nepal. The value of output from agricultural and related activities has been disaggregated at the sub-sector/major crop categories level in

Figure 2.2 (a): Net imports of cereals and (b) net imports of fruits and vegetables as a share of domestic production



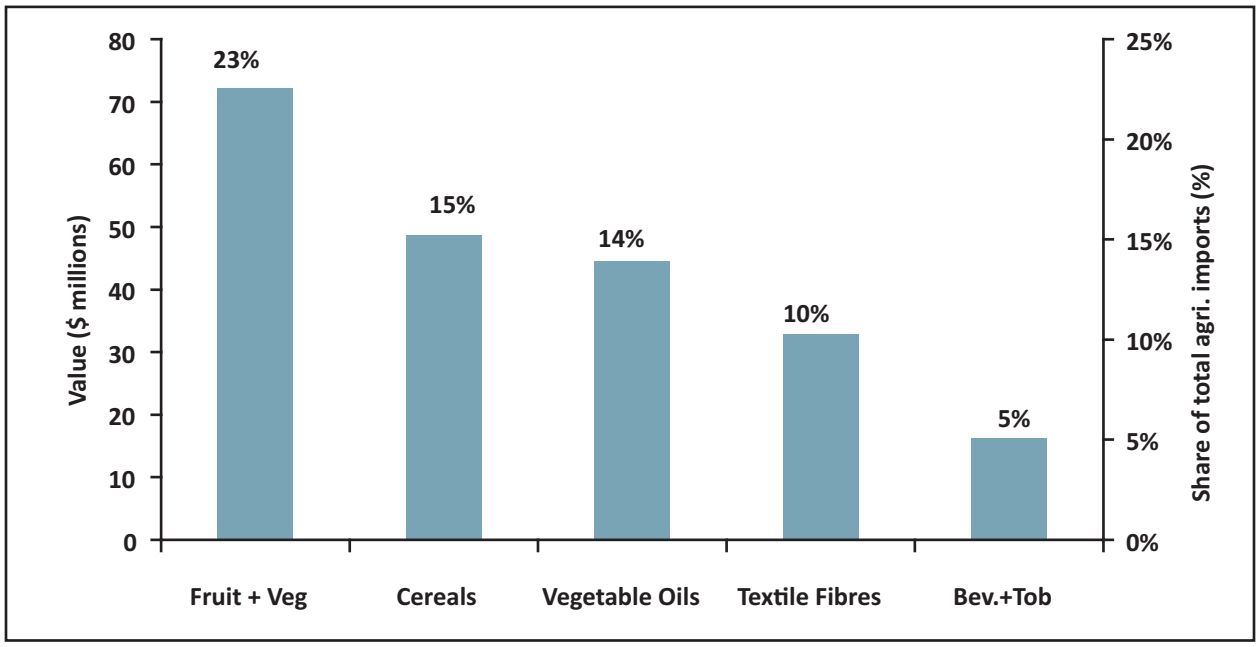


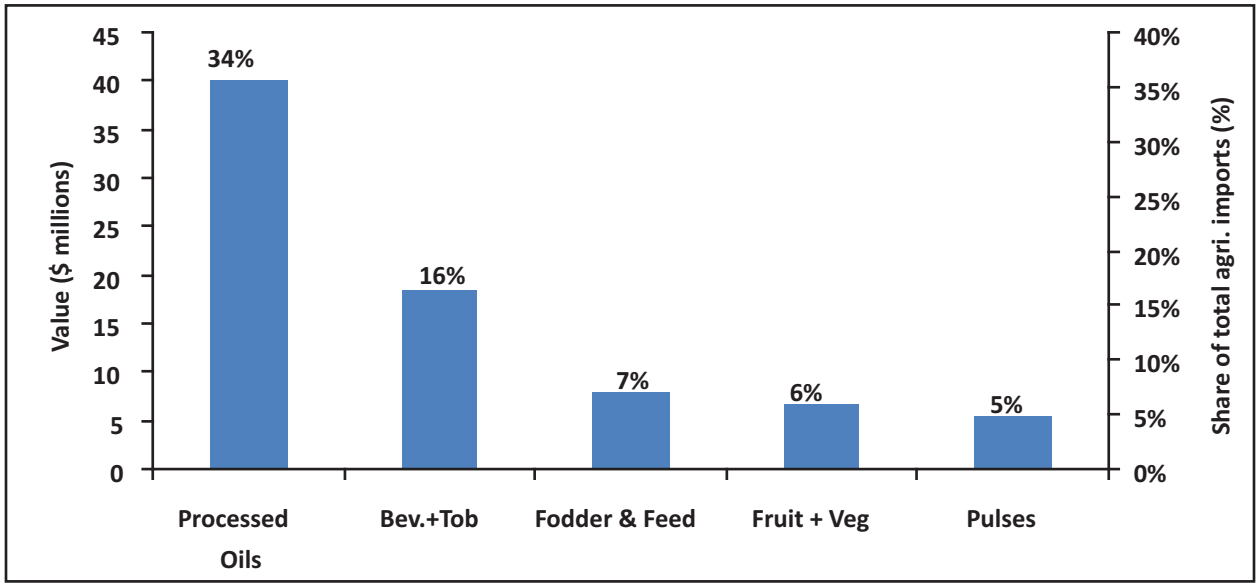
Source: FAO, 2010

order to examine the areas in which Nepalese agriculture is gaining ground and the sectors that have been losing their share. Compared across two time periods (TE 1981 and TE 2005), the shifting sectoral share in Nepal's agriculture suggests diversification towards high value crops and products (Figure 2.5).

The share of the high value sector (comprising fruits & vegetables, spices & condiments and livestock) has risen from 54% to 59% between TE 1981 and TE 2005. More importantly this increase has not come from the livestock sector (whose share in total value of output has in

Figure 2.3 (a) Nepal: top 5 agro-imports (TE 2007); (b) top 5 agro-exports (TE 2007) based on % share in total agro imports/exports



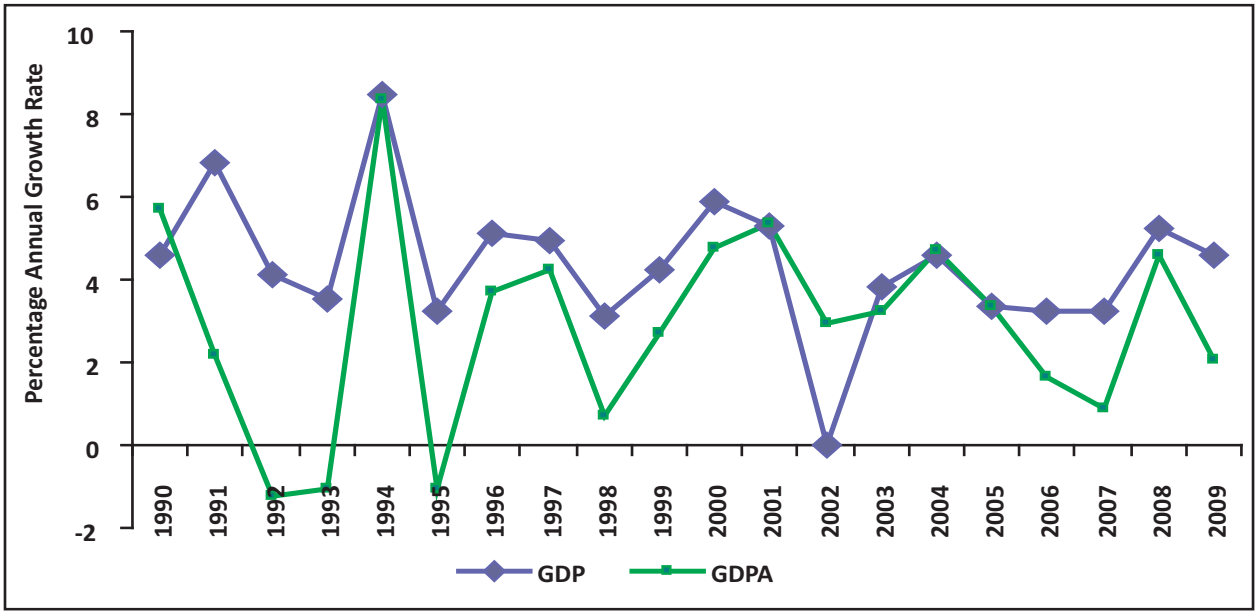


Source: FAO, 2010

fact reduced) but is largely due to the growth of the fruits and vegetables (F & V) sector. The share of F & V has jumped from 13.7% to nearly a quarter of the total value of agriculture.

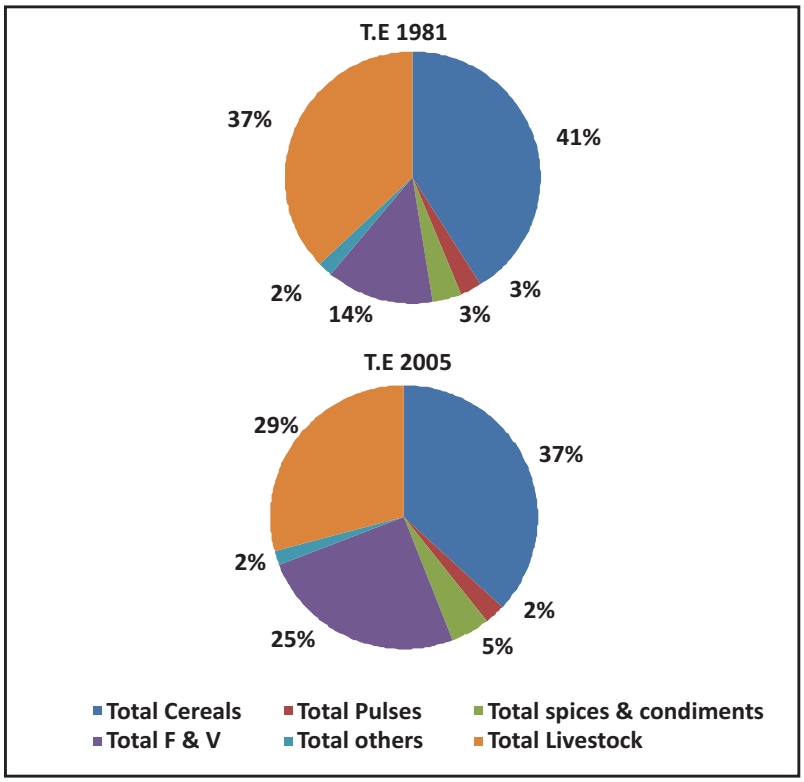
The cereal share has decreased from 41% to around 37% from TE 1981 and TE 2005, but they still make-up the largest share in Nepal's agriculture in value terms. The area under cultivation is

Figure 2.4 Annual growth rates of GDP and GDPA in Nepal (1990 - 2009)



Source: NRB, 2010. Note: Years shown refer to FY year ending 2009 etc. CV refers to coefficient of variation.

Figure 2.5 Value of output from agriculture and allied activities



Source: FAO, 2010

also dominated by cereals with almost 75% of total cultivated area occupied by the five main cereals – paddy, maize, wheat, millet and barley. Paddy, the most common crop, accounted for 35% of total cultivated area and 46% of the cereal area in 2008/09 (MoAC, 2009). On the other hand, fruits and vegetables occupied only about 6.5% of the total cultivated area but contributed a much larger proportion of the overall value of agricultural output.

Performance Trends of Major Agricultural Sectors in Recent Years

Key Cereals

Cereal cultivation is the mainstay of Nepal's agriculture and paddy by far is the most important crop – both in terms of area and production among cereals. It also forms a major component of the staple Nepalese diet. The

other key cereals in terms of share in area are – maize (26%), wheat (21%), millets (8%) and barley (less than 1%)[2]. Paddy and wheat are mainly produced in the *Terai* region with the area share of 70% and 57% respectively and the production share of 72% and 63% respectively. Maize is predominantly cultivated in the Hills with this region having almost 70% of total area under maize as well as contributing a similar share of the total production of maize (MoAC, 2009). Yield levels of maize in the Hills are however lower compared to the *Terai* region.

Overall cereal area has barely grown at the rate of 0.5% per year in the period 2000/01 to 2008/09. Production growth rates have also been low as seen earlier. Among the three major cereals (rice, maize and wheat) maize shows the fastest growth in the current decade compared to the earlier period (Figure 2.6).

In fact maize is the only cereal whose production growth rate (3.1%) exceeds the population growth rate of 2.1% of Nepal. The production growth in maize has been driven largely by yield enhancement which shows a 2.4% rate of growth, rather than an increase in area (which shows an annual average growth of only 0.8% during 2000/01 – 2008/09). This increase in yields of maize is largely attributed to use of hybrid maize seed which is sourced from across the open border from India. Officially, the Government of Nepal (GoN) is currently in the process of approving some varieties of hybrid maize produced by private companies in India, but unofficially hybrid maize seeds have been available in Nepal for the past few years[3]. Adoption of hybrid maize may have been driven by the rising demand for poultry feed in Nepal[4] and demand for maize from the domestic poultry feed industry. As mentioned previously, the overall yield levels of maize in Nepal are still low compared to maize yields in other south Asian countries but are higher in comparison to the bordering Indian states. The growth in maize yield during 2000/01-2008/09 also seems to be faster – 2.4% in Nepal compared to an annual average growth rate of 1.7% for the four neighboring Indian states[5].

Paddy yield growth has shown only a marginal increase in rate of growth in the recent period compared to the 1990s, going up from 1.3% per annum on average during 1991/92 – 1999/00 to 1.4% during the period 2000/01-2008/09. Rate of growth in wheat yields has however declined from 2.9% in the 1990s to only about 1.2%. Production growth rates of both paddy and wheat show a significant decline for the period 2000/01-2008/09 compared to the 1990s, which is an issue of concern. Comparing the growth in yield of rice and wheat in the neighboring Indian states during 2000-08 shows that in the case of rice Nepal is doing better (1.4% in Nepal compared to 0.7% average growth rate in the four Indian states), while wheat yield has shown a higher rate of growth in the Indian states (1.9% for the Indian states compared to 1.2% for Nepal). Examining the underlying reasons for low productivity in cereals in Nepal and the neighboring states of India and identifying common problems and linkages, if any, which can be addressed through regional co-operation is a potential area for research in the future.

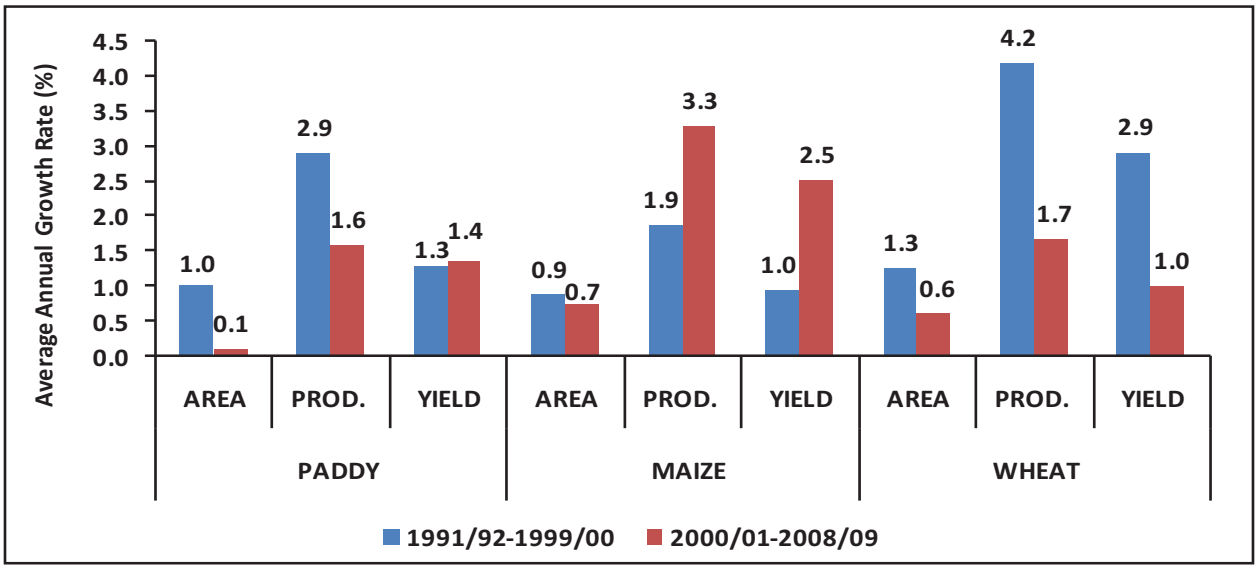
[2] Share in total area under major cereals TE 2008/09 (MoAC, 2009)

[3] Based on discussions with local resource persons

[4] A few news reports estimate high growth in demand for poultry feed (for instance, Republica, 15th May 2010, http://www.myrepublica.com/portal/index.php?action=news_details&news_id=18657, accessed: 28th June 2010)

[5] Estimated based on average yield of maize for the four states of Uttarakhand, Himachal Pradesh, Bihar, Uttar Pradesh (Min of Agri., GoI, various issues).

Figure 2.6 Area (A), yield (Y) and Production (P) average annual growth rates of major cereals for 1991/92 – 1999/00 and 2000/01 – 2008/09



Source: MoAC, 2009

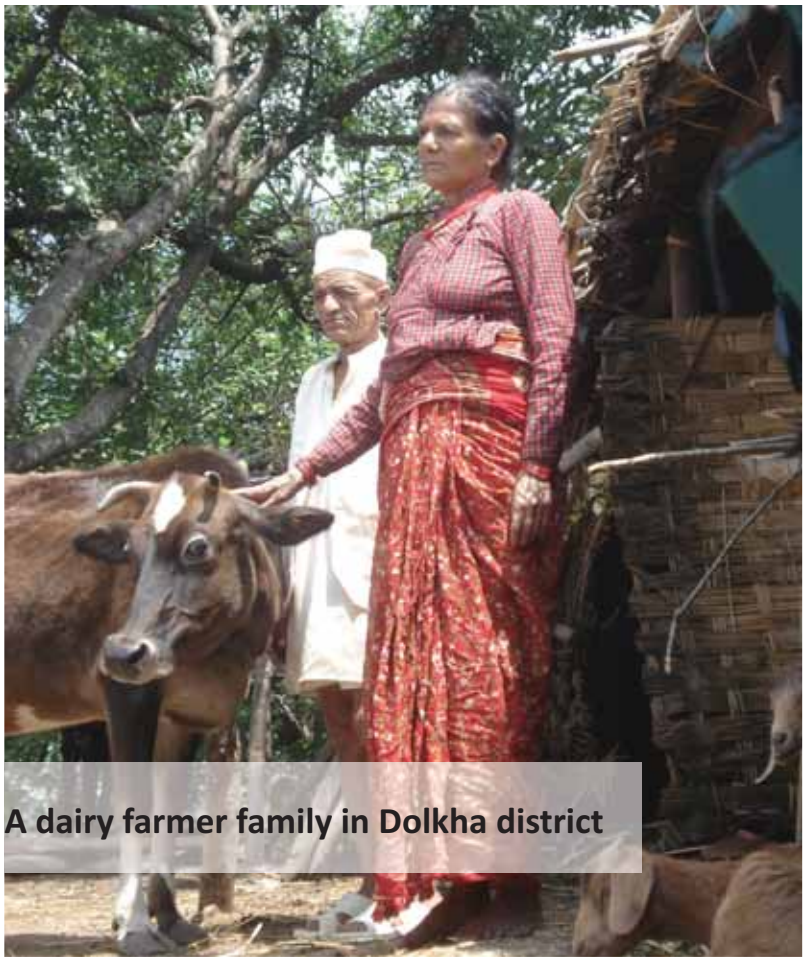
High Value Sector: Fruits, Vegetables, Milk and Meat

The high value sector, as seen previously, has been increasing its share of contribution to the overall value of agricultural output. Within the high value segment, livestock products share has decreased while that of fruits and vegetables has gone up. The growth rate (in physical quantities) of these individual sectors underscores this observation. Vegetable production growth rate is by far the highest with production increasing from 1.65 million tonnes in 2000/01 to nearly 2.3 million tonnes in 2008/09 at an average rate of 7.0% per annum. The roots and tubers category has also been showing an increase in area and production, especially with potato showing good growth. The area under potato increased by more than 40% and the production by more than 84% in 2008/09 compared to 2000/01 levels (MoAC, 2009). Potato production in this period had grown at an average annual rate of nearly 8.5%. The majority of the potato production was in the Hills having 44% share of the production, with the *Terai* close behind with a share of 42% (TE 2006/07). The rate of growth has however been higher in the *Terai*, with production growing at nearly 14% (annual average rate growth rate) over the period 1998/99 to 2006/07 compared to a corresponding growth rate of 6.7% in the Hill region (MoAC, 2009).

The growth rate of fruit production, though not as high as the vegetable sector, is substantial at 4.2% per annum with production quantity reaching 0.58 million tonnes in 2008/09 up from 0.49 million in 2000/01. Livestock products – milk and meat have also been growing, albeit at a lower rate (at 3.1% and 2.8% respectively) (MoAC, 2009).

The diversification towards high value crops can benefit farmers, especially those small-holders who form the large majority of Nepal's agricultural holdings. But in order to pay

adequate dividends, high value crops require proper infrastructural support. Currently fruits and vegetable cultivation is centered on the *Terai* region and to some extent in the Hill districts having better road connectivity (with the share of *Terai* and Hill regions being 57% and 39% respectively in 2008/09). F & V production is also more common in the regions close to urban demand pockets. The central development region (of which Kathmandu valley is a part of) had the major share of F &V production accounting for more than 41% of the total F & V production in 2008/09 (MoAC, 2009).



A dairy farmer family in Dolkha district

An important allied sector that assumes importance in Nepal context is the forestry sector. The forest and shrub area together covers about 5.83 million ha of land, which is 39.6% of the total land area of the country (FRA, 2010). Forests form an integral part of the farming system and a source of basic resources. For instance, fuel wood derived from forests was estimated to have contributed to 84% of the total energy consumed in 2006/07 as well as being the source for almost 42% of the fodder requirement in Nepal (Acharya & Dangi, 2009). In addition to indirect services, forestry in Nepal also contributes directly in the form of high value products from medicinal, aromatic plants and other non-timber forest produce. The forestry sector was estimated to have contributed nearly 9.5% to the national GDP from direct products alone in 2006/07 (MoEST, 2008). Optimal utilization and sustainable management of the forest resource is also important as it is an important factor in contributing to rural incomes and livelihoods.

Overall agriculture development policies and programs of the government in Nepal were largely driven by the five year planning exercises. The landmark agriculture sector specific policy document which framed agriculture sector development efforts in Nepal was the 20 year Agriculture Perspective Plan (APP, 1995 – 2015). The APP aimed at rapidly increasing the agricultural growth through a strong emphasis on investments in specific priority input areas, and a shift towards encouraging commercialization and high value diversification of agriculture. The APP framework has shaped subsequent agriculture sector policies of the Nepal government to a large extent. Both the National Agricultural Policy (NAP), 2004, as well as

the current planning process under the Three Year Interim Plans[6] articulate the long term objectives and the strategic framework set forth in the APP. The NAP remains the official policy framework for all interventions in agriculture sector and has been supplemented with sector specific and individual commodity specific policies such as the National Seed Policy 2000, National Fertilizer Policy 2002, National Irrigation Policy 2003, National Water Plan 2005, Agricultural Business promotion policy 2006, Commercial Agriculture Policy 2007, Agriculture Bio-diversity Policy 2007, etc. The National Agriculture Sector Development Priority plan (NASDP) endorsed by the Government of Nepal in September 2010 covering the period 2011-15 expands upon the NAP-2004 taking into account the changes in the social and political environment in the country. Some of these policies and programs are examined below in the discussion on constraints and challenges for agriculture in Nepal.

2.4 Constraints and Challenges for Augmenting Availability from Domestic Production

Land Resource

It was observed earlier that the population distribution in Nepal shows a high concentration in the *Terai* region and to some extent in the Hills (refer Table 2.1). One of the prime factors influencing this distribution in growth and concentration of population is the spatial distribution of agricultural land in Nepal. Overall only 16% of Nepal's total geographical area is under agricultural production, out of which more than 50% is concentrated in the *Terai* and about 37% in the Hills. In the Mountain region only 3.9% of the total land area is arable compared to 38% in the *Terai* (CBS, 2006). The distribution of per capita cultivated land[7] availability also shows wide variations across the three spatial regions (Table 2.3).

Though strictly comparable estimates on land availability and use across time in Nepal are not available, broadly however it seems that land availability per capita has come down with the rapid growth of population (refer Annex A.2, Table 2A.1 for details). The Mountain region has the highest per capita availability of cultivated land (0.31 ha) even though its share of arable land is the lowest, possibly because of its sparse population. The Hill region has the lowest per capita cultivated land (0.16 ha) while in *Terai* it is marginally higher (0.17 ha). Both these regions would come under increasing stress with respect to land availability for agriculture as population pressure increases at the current rates of growth. This would have implications for food production and availability in the region.

Table 2.3 Share of cultivable area and cultivated land per person

Region	Share of total cultivable area (2001)	Cultivated land per person (ha) 2000
Mountain	13%	0.307
Hill	37%	0.163
Terai	50%	0.167
Nepal	100%	0.175

Source: CBS, 2006 and Subedi, 2003. Note: Land use statistics based on Japan Forest Technology Association (2001), Information System Development Project for the Management of Tropical Forest (Subedi, 2003). Data for land use in Nepal is not available for recent years.

[6] Following the major political changes in Nepal after 2006, following the end of the insurgency and the formation of a Constituent Assembly, the Five Year planning process has put in abeyance, and in the interim period the planning process has shifted to shorter Three Year Plans, the first of which ran from 2007/08 to 2009/10.

[7] Cultivated land here includes area under grasslands

The reducing land availability per capita is compounded by the fact that distribution of landholdings among farmers in Nepal is also highly skewed. More than 75% of the agricultural landholdings are less than 1 ha and 47% are less than 0.5 ha in size. Together these small land holders account for about 40% of the total cultivated area (Table 2.4). The experience of China, Indonesia, and even Bangladesh in recent years shows that small land holding size need not be a constraint to achieving agricultural growth. Strategies for augmenting production and agricultural incomes have to facilitate higher returns to smallholders and institutional arrangements supporting agriculture (output markets, extension, credit etc.) have to be designed to taking into account this skewed distribution of landholdings.

With the pattern of land-holding being as it is in Nepal, it is no wonder that land laws in Nepal and the issue of land reform has come up high on the agenda of the government since 2006, after the end of the conflict. The emphasis recently has been on 'scientific land reform' and the budget 2008/09 set aside funds for a High Level Scientific Land Reform Commission 'for the abolition of feudal land ownership and production relations'. Additionally, the Interim Constitution also has a commitment to 'scientific land reform' written into it.

Table 2.4 Structure of land holdings in Nepal (2001)

	Marginal	Small	Medium	Large	Total
Range(in Ha)	0.1 - <0.5	0.5 - <3.0	3.0 - <5.0	5+ Above	-
Number of holdings as % of total	47.7	49.4	2.1	0.8	100
Share of land owned as % of total cultivated area	14.7	68	10	7.3	100

Source: Chapagain (2010)

The agenda of land reforms, however, is not new in Nepal. Indeed, formal land reforms in Nepal have been underway since the 1950s, but its slow pace of progress has been widely criticized (Wily, Chapagain, & Sharma, 2009). Some of the problems that have been pointed out with the earlier efforts at land and tenancy reform in Nepal include – the shift from feudal land relations to modern property rights has been slow, and in some aspects incomplete; tenancy reforms have not taken off due to problems of implementation and 'an estimated one million farm tenants are not even registered over and above those who are (541,802)'; the land ceilings fixed for various categories of landholdings were too high limiting the scope of redistribution and when the ceilings were finally lowered after 1995, their implementation was never complete; the real land ownership situation has become more opaque through sub-divisions and sale, while the survey and registration of entitlements by the Ministry of Land Reform and Management is lagging behind despite recent focus on 'system reforms' within the Ministry (ibid). It remains to be seen how these problems would be resolved in the future. With respect to laws governing land lease markets, tenancy and other property relations, there is limited clarity owing to the fact that the reform process is still in a nascent stage.

Water Resources

Nepal's water resource potential is very high considering the fact that it possesses 2.27% of the world's water resources (Bhattarai & Goutam, undated). The annual runoff from all rivers is estimated to be over 220 billion m^3 and groundwater resources are estimated to be around

12 billion m^3. Water use for domestic and agriculture needs is estimated to be 13.8 billion m^3 and expected demand by 2027 is 38.8 billion m^3. Even though the total supply of water exceeds the expected water demand from all sectors in Nepal, a number of challenges limit the extent to which this resource can be tapped for sustainable use. Seasonal variations in flows are high with 82% of annual river flows occurring from June to November. 80% of the annual mean precipitation of 1530 mm is received during the summer monsoon period from June to September. Also sedimentation in rivers in Nepal is high with the total sediment load per year estimated to be equivalent to 1 mm of top soil being washed away (Water and Energy Commission Secertariat, 2002). This poses certain technical challenges to development of large surface storage structures for harnessing the water potential of Nepal. Additional challenges are posed due to the currently limited understanding of the fragile eco-hydrology of the Himalayas and the possible impacts of factors such as climate change.

Another crucial aspect to be considered with respect to harnessing surface water in Nepal is the issue of regional, cross-country collaboration and water sharing. Regional cooperation for developing the full potential of this resource is crucial for meeting water and power needs of Nepal and its co-riparian countries, as well as for flood control in the downstream areas of rivers originating in the Himalayas. This requires collaborations in technical aspects in order to better understand the hydro-geology of the Himalayan watershed and for investing in the required infrastructure, and also regional negotiations to arrive at suitable water and power sharing arrangements between countries.

Agricultural Inputs Scenario: Status, Constraints and Challenges

Irrigation

Irrigation being one of the primary inputs for agriculture, there is a need to examine the policies and institutions involved and the investments required for accelerating its development – especially in the *Terai* region. Total irrigated area in Nepal in 2008/09 was reported to be 989,230 ha or 32% of the total cultivated area (MoAC, 2009). Overall irrigated area under crops in Nepal has been showing a gradual upward trend with an annual average growth of 1.9% in the period 2000/01 to 2008/09 (ibid). This is however a much slower rate of increase compared to the average growth rate of 4.6 % reported over the period 1995-96 to 1999/00 (ANZDEC, 2002).

The Agriculture Perspective Plan (APP) (APROSC & JMA inc, 1995) which has been the main long term perspective plan for boosting agriculture in Nepal stressed upon irrigation as one of the priority input areas. Technically all of the *Terai* could be irrigated by large surface water schemes, but the capital intensive nature of these projects, the socio-economic constraints and resolving issues related to cross-country water sharing rights pose a challenge (ANZDEC, 2002). On the groundwater front also the resource potential is high and the groundwater aquifers underlying the *Terai* are some of the 'most productive aquifers on the sub-continent' (ibid). Considering the relative ease and lower cost of tapping this resource both the APP and subsequent irrigation planning in Nepal under the five year plans laid emphasis on developing groundwater irrigation, especially with a thrust on shallow tube wells (STWs) and in some areas on extension of deep tube wells (DTWs).

Irrigation potential and actual utilization varies across the different ecological regions of the country. In the 1990s, overall less than 30% of Nepal's cultivated area was actually irrigated and this percentage varied from 38% in the *Terai* to less than 18% in the Mountain regions (NENCID, 1999). The total irrigable area itself was however low in the Mountains and Hill regions, but the level of utilization of the irrigation developed was higher in the Mountains and Hills (66.7% and 56.5% respectively). On the other hand the *Terai* region which one would expect to lead in terms of irrigation development and utilization actually showed a poorer level of utilization of less than 39% (refer annex Table 2A.2 for details). The irrigation statistics for 2005/06 (Table 2.5) of the Department of Irrigation do indicate an increase in the cultivable command area (CCA) in *Terai* with the CCA rising up to 58.5% of total irrigable area. Mountain and Hill regions also show an increase. More detailed data if available could help analyze whether the increase is due to groundwater or surface-water based extension of irrigation and formulate strategy for the future accordingly.

With respect to groundwater use, by 2002 an estimated 50,000 STWs were operating in the *Terai* (ANZDEC, 2002). To meet the targets set under the APP the Government of Nepal had initially put in place a subsidy on STWs (ranging from 30 to 60% of the capital cost) and DTWs (up to 84% of the capital cost). However under the conditions placed as a part of the Second Agricultural

Table 2.5 Status of irrigation development 2005/06

	Mountain	Hill	*Terai*	Total
Total irrigable area ('000 ha)	60	369	1338	1766
Irrigation development status (ha) (as % of total irrigable area)	50 (83.8%)	182 (49.5%)	995 (74.4%)	1227 (69.5%)
Cultivable Command Area (CCA in ha) (as % of total irrigable area)	25 (41.8%)	118 (32.1%)	783 (58.5%)	926 (52.4%)

Source: DoI, 2007

Program Loan the subsidy on STWs was removed. The Agricultural Sector Performance Report (ibid) notes that the progress under the STW program slowed down and against the APP target of 90,000 ha to be added under new ground water schemes by the end of the period 1997/98-2001/02 the target achieved was only 29374 ha. The latest available figures on number of STW and DTW for the year 2005/06 indicate the number of STWs at 67705 and number of DTWs at 711 (DoI, 2007) still below the 2001/02 APP target.

The factors behind the slow spread of ground water irrigation in the *Terai* region are not clear. The withdrawal of subsidy provided to STWs could be one of the reasons, although it remains to be firmly established. If lack of investment capability among farmers is the constraint, then it is necessary to find means and ways of extending incentives such as low cost credit for irrigation expansion.

The irrigation sector also saw changes in the institutional aspects with the enactment of the Local Self Governance Act (LSGA) in 1999 which handed over the management of local resources at the district level to the District Development Councils (DDCs). The adoption of

the new Irrigation Policy in 2003 which led to legalization of water user associations and laid stress on private investment in irrigation development also necessitated reforming the approach pursued under the APP which leant more towards public efforts to expand irrigation. Nepal has had a long history of community managed surface water irrigation systems. By 2005/06 almost 66.4% surface water irrigated area was under Farmer Managed Irrigation Systems (FMIS) (ibid). Currently the Department of Irrigation is implementing Community Managed Irrigated Agriculture Sector Project (CMIASP) with funding from ADB and OPEC which focuses on improving FMIS across 35 districts. Strengthening capacity and improving the functioning of the water user associations of the FMIS would be essential for sustainable and efficient use of surface water irrigation projects. Similarly the Irrigation and Water Resource Management Project (IWRMP) funded by the World Bank/IDA focuses on the rehabilitation and supporting of small and medium farmers managed irrigation schemes as well as on supporting enhancement of ground-water development in targeted areas of the country.

Seed and Fertilizer

Utilization and Status

The importance of irrigation and other inputs such as improved seeds in boosting productivity is well known. In Nepal's case the yield differential figures in the case of paddy for 2008/09 for cereals with irrigation and improved seeds underscore this point. For instance in the *Terai* improved seeds under irrigation resulted in yield levels of almost 3500 kg/ha which was 41% higher than the yields resulting under the unirrigated/local seeds condition (Table 2.6).

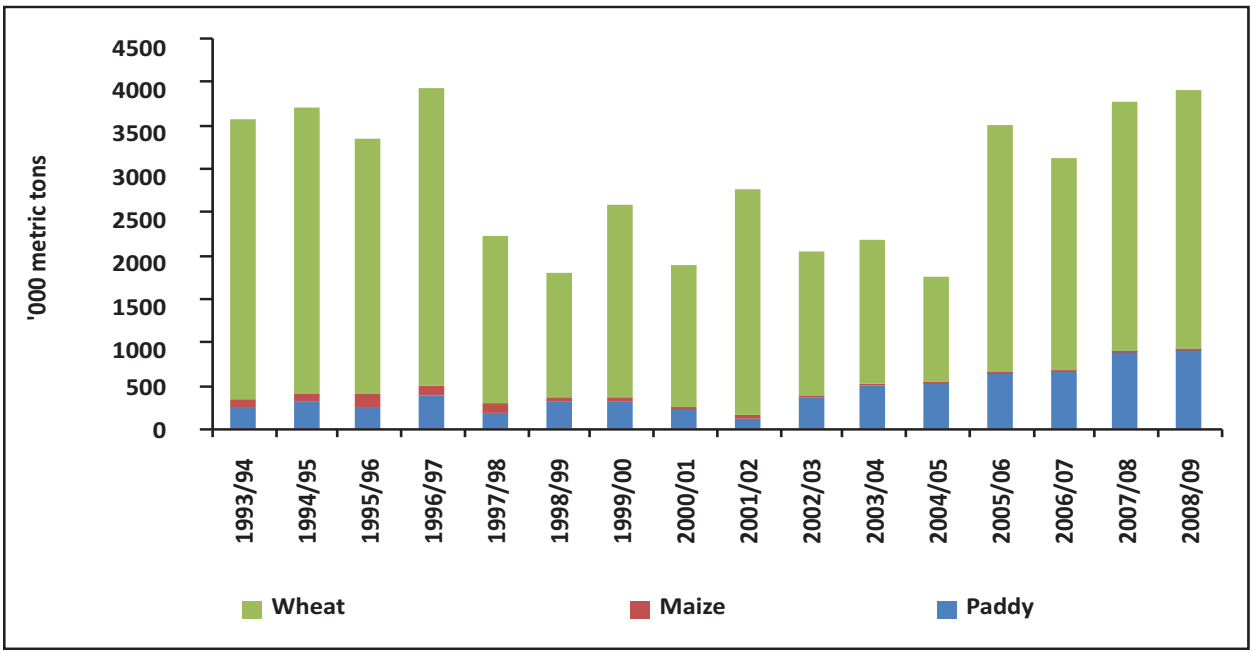
The official estimates for usage of improved seeds and fertilizers in Nepal reflect very low intensity of use. The total annual supply of improved seeds has not reached even 4000 metric tons in the entire period from 1993/94 to 2008/09 (Figure 2.7 a). The majority of improved seed supply is made up of wheat seeds and hardly any improved seed supply for maize. However, as mentioned earlier, it has been suggested that the growth in maize yields has been boosted through the use of hybrid seeds imported through unofficial channels from India. Also it appears that imported seeds, especially from China, have come to play a major role in enhancing yields of vegetables, according to some accounts. As most of this unofficial cross-border trade is not captured in the official supply figures these estimates of improved seeds most likely underestimate the actual ground situation.

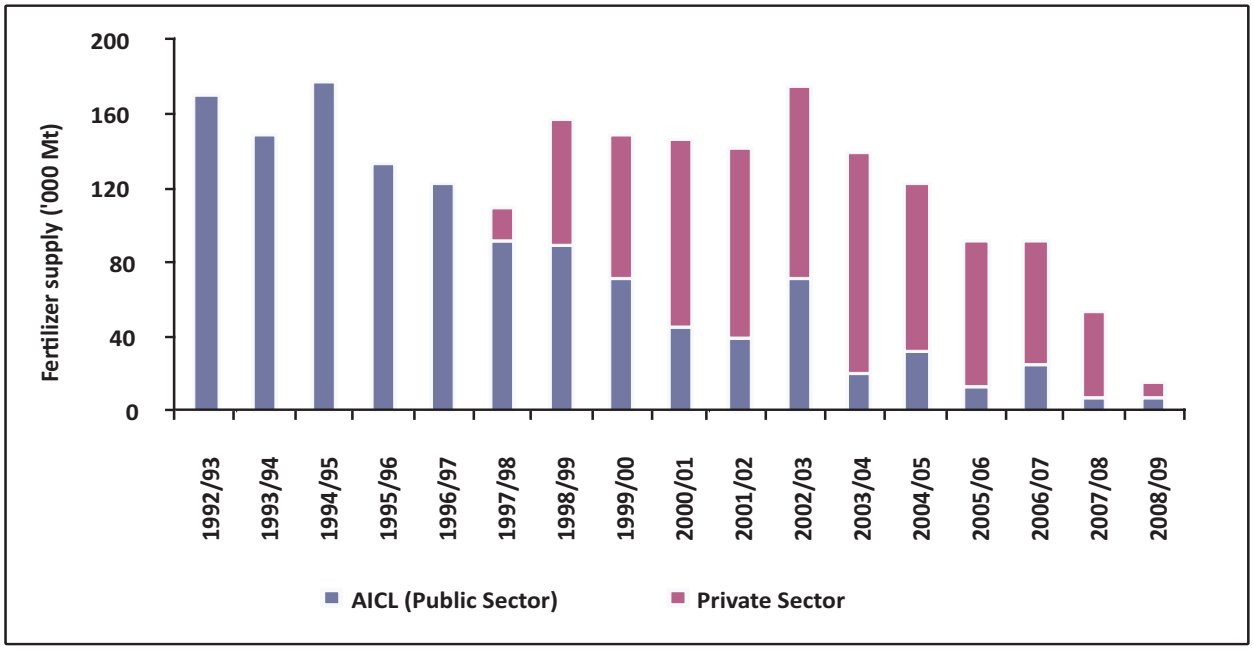
Table 2.6 Yields of improved/local seeds under irrigated/unirrigated conditions (kg/ha) 2008/09

Paddy	Irrigated		Unirrigated		Overall
	Improved seeds	Local seeds	Improved seeds	Local seeds	Average yield
Mountain	2550	1800	1812	1071	1989
Hills	3356	2176	2397	1811	2722
Terai	3496	2331	2524	2043	3028
Nepal	3439	2288	2446	1898	2907

Source: MoAC, 2009

Figure 2.7 (a) Supply of improved seeds in major cereals 1993/94 - 2008/09 (in metric tons) (b) Supply of fertilizer by AICL and private sector (in '000 metric tons) 1992/93 to 2008/09





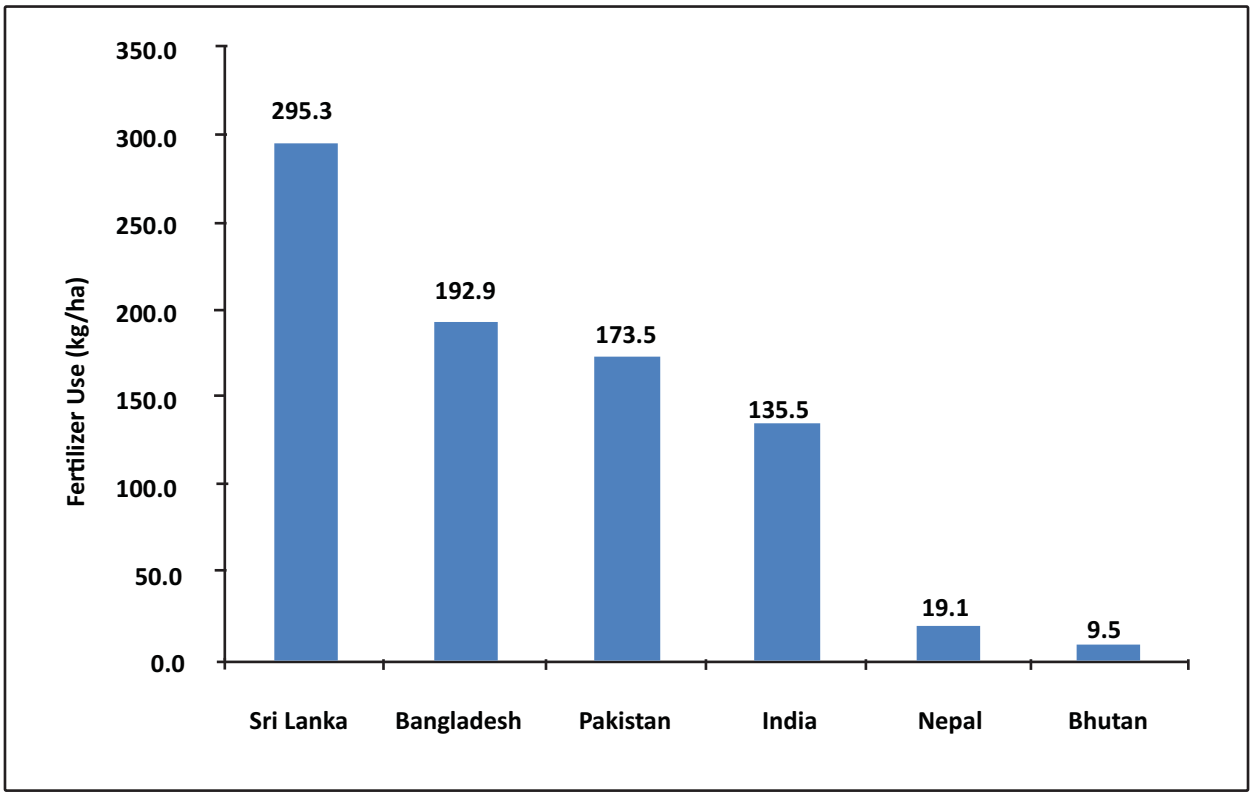
Source: MoF, 2009

The fertilizer supply figures (Figure 2.7b) also show a steep decline in recent years with the private sector supplies also falling. Here again unofficial cross border trade of fertilizer is not captured which could be contributing a substantial portion of the fertilizer requirement in Nepal especially in the *Terai* regions close to the Indian border. It was estimated that informal sources could have accounted for 60% of the total supply in 1997/98 and 80% in 2002/03

(FAO-WFP, 2007). Fertilizer usage in Nepal is also one of the lowest in the region (Figure 2.8). Nepal's average fertilizer use of 19.1 kg/ha[8] is higher than Bhutan's but much below the level of fertilizer use seen in the rest of the region. Nepal's fertilizer use is only slightly above the average fertilizer use of 15.6 kg/ha for the category of least developed countries. These usage figures, however, are computed based only on the fertilizer supply data, and hence do not account for informal sources/unrecorded import of fertilizers.

The Nepal Living Standards Surveys (NLSS) provide information on prevalence of use of improved seeds and fertilizers among farmers but do not provide any estimates of intensity of use among them. In terms of adoption of improved seeds NLSS-II (2003-04) reports that the highest number of improved seed users were vegetable farmers with about 20% of winter vegetable growers using improved seeds. For fertilizer use it reports that percentage of growers using fertilizers was highest among paddy farmers at about 66% compared to 55% at the time of NLSS-I (NLSS-II, 2003/04).

Figure 2.8 Fertilizer use in South Asian countries (TE 2007)



Source: WB, 2010

[8] Fertilizer use here is estimated based on the quantity of fertilizer supply in a country through formal / official marketing channels. It does not indicate actual usage as it does not account for fertilizer supply from informal or unofficial sources and fertilizer stocks, if any, with farmers.

Data on actual fertilizer consumption is available only from sample surveys carried out as a part of two studies in 2001 and 2002. The two surveys estimate fertilizer usage of 58 kg/ha (ANZDEC, 2002) and 56 kg/ha (OPM, 2003) respectively, much higher than what is estimated based on the supply figures.

Seed & Fertilizer Policies and Programs

Prior to the 1990s seed and fertilizer supply and distribution in Nepal was undertaken by a state monopoly – the Agricultural Inputs Company (AIC) at a subsidized rate through their own distribution network across the country. After Nepal's Structural Adjustment Program and consequent liberalization, as a part of the overall reduction and cutback of government role and interventions AIC was split into two different organizations handling fertilizers and seeds separately.

The seed sector in Nepal is regulated under the Seed Act, 1988. A National Seed Board (NSB) was established to oversee policy and regulation of the seed sector in Nepal. The NSB approves the seed varieties that are recognized for sale and distribution in Nepal and only those seed varieties on the approved list can be imported legally into Nepal. But this does not stop the informal trade in seed and crop varieties across the open border to India (Shreshtha & Wulff, 2007). After AIC was split the seed supply wing was reorganized as the National Seed Company Ltd (NSC) in 2002.

Within the private sector in the seed industry in Nepal there are no big players. There are, however, 897 registered 'seed entrepreneurs' who are mostly seed dealers and traders who supply other agricultural inputs. They mostly deal with vegetable and flower seeds while NSC largely supplies cereal seeds. The few seed companies that are there in Nepal do not have any own varietal development activities (ibid). The unmet demand for seeds is fulfilled through uncontrolled import of seeds, in numerous cases violating the provisions in the Seeds Act.

The Department of Agriculture has been implementing the District Seed Production Programme (DISSPRO) involving private (group based) and cooperative growers while technical support is provided by the District Agricultural Development Office. There have also been various donor aided programs, the most successful and long-running of which has been the Hill Maize Program supported by the USAID and the Swiss Agency for Development and Co-operation in collaboration with the International Maize and Wheat Improvement Centre (CIMMYT), along with NARC and other departments of the Nepal government. This program has to some extent eased the seed supply problem with respect to quality maize seed, as well as helped in capacity building of local research agencies. Bulk of the seed is still produced informally and suffers from low quality, improper or no labeling, and lack of proper certification.

With regard to the fertilizer sector, by the Xth five year plan (2002-2007) subsidy on fertilizers were removed under the National Fertilizer Policy (2002) and private market supply was expected to fill in the gap left by erstwhile AIC. Nepal does not produce any fertilizer of its own and the role of private traders is to essentially import and undertake distribution. However as the fertilizer supply figures show private supply has been declining. Some of the

factors for lackluster private participation could be due to the ease of unofficial cross-border trade of subsidized fertilizer which might make it unprofitable for private traders to supply to the main fertilizer consuming areas in the *Terai*. Also lack of infrastructure and high costs of supplying and maintaining a distribution network could also be a disincentive for private fertilizer trade in the Hill and Mountain regions. Finally the overall political instability may be discouraging private sector from investing in the required infrastructure for maintaining supply chains across the country.

In 2008 the Government of Nepal re-introduced a subsidy scheme on fertilizers in order to tackle the problem of dwindling fertilizer supplies. Under this the sale price was fixed at 20-25% higher than that prevailing in India for five import points on the border and AIC was appointed the sole agency to import fertilizer to be distributed at subsidized rate through cooperatives. The retail price for farmers was the sales price at the import points plus the transportation cost involved and AIC would receive the difference amount between the actual of import and the sales price at import points. The scheme aimed to supply 100,000 tons of fertilizer annually. However the government has been unable to ensure timely supply of adequate quantities of fertilizer while private traders have found it difficult to compete with the subsidized rates (Shrestha, 2010). At a broader level the usefulness of the subsidization policy has also been questioned in some quarters when the rates of application are very low. In this context, there have been suggestions that government intervention through fertilizer subsidy be limited to inaccessible areas, while leaving market forces to resolve the supply problem in the accessible areas.

Agricultural support: Agricultural Research, Extension and Credit

Agricultural research

The Nepal Agricultural Research Council (NARC) is the principal agency undertaking research in agriculture. Some other agencies such as the Nepal Academy of Science and Technology (RONAST), National Agricultural and Research and Development Fund (NARDF), academia (principally the Institute of Agriculture and Animal Science—IAAS) and some NGOs are also engaged in undertaking or sponsoring agricultural research, but their role is relatively small. NARC conducts research programmes either itself or in collaboration with regional and international institutions various commodity and disciplinary areas including social sciences.

The NARC's ability to raise up to the challenge of developing appropriate high quality seeds, improved livestock breeds, and technologies appropriate to the agro-ecological conditions in Nepal have been questioned. A DFID funded Review of Research Impact, Responsiveness and Future Priorities carried out in 2005 (ITAD 2005) found that rice varieties developed by NARC did not generate much impact in terms of yield gains while impressive progress has been achieved in the case of vegetables (mainly off-season vegetables). Research impacts have not been seen to such an extent, however, with respect to improved breeds of livestock.

Several issues confront the country's agricultural research system. For one thing, it has been widely commented that it is not dynamic enough in responding to the emerging needs of

the farmers and entrepreneurs operating under an increasingly competitive environment. Adequate staffing has also been an issue at NARC. In 2006, NARC had a total of 406 slots for scientists and additional 306 slots for technical support staff. Only 61% of these slots were filled and the remaining 39% were lying vacant. Forty-five percent of the positions of scientists were unfilled. NARC's share in the total national budget has declined from 0.58% in 2001/02 to 0.21 in 2008/09. Similarly, its share in the MOAC budget dropped from 14.7% to 8.8% over the same period.

From the perspective of food and nutrition security technological progress to improve productivity levels has to be broad based covering not just cereals, but also milk, meat products, eggs, fish, fruits, and vegetables. Research and extension services have to result in improved cropping and livestock practices and as well as address problems relating to crop and animal diseases and health.

Agricultural Extension

Since the beginning of institutionalized agriculture extension in Nepal in 1952 under the Department of Agriculture (DoA) the structure, organization and the extension models and approach used have undergone frequent changes. In 1966, the DoA was split into five departments - Department of Agriculture Extension, Department of Fishery, Department of Horticulture, Department of Livestock Health and the Department of Agricultural Education and Research. Then in 1972, these departments were merged into one as Department of Agriculture as it was felt that there was a lack of effective co-ordination between the five departments. Then again after seven years in 1979, two departments- Department of Agriculture and Department of Livestock Development and Animal Health were created to focus on crop and livestock extension services. Later in 1991, the department went through one more iteration with all extension services being brought under one organization as Department of Agricultural Development. This was quickly followed by reorganization again in 1995, back into two departments – Department of Agriculture and Department of Livestock Services. Thereafter in 2000 it went through one more round of restructuring in which nine program directorates were established under the DoA. These were later expanded to 12 Program Directorates and 14 National Programs in 2004. Such frequent organizational changes make it difficult to undertake long-term programs maintaining adequate focus on the goals and objectives to be achieved.

The public extension system in Nepal is also hampered by a lack of resources, especially trained manpower. Currently the extension activities relating to crop cultivation practices and livestock and animal health issues are carried out through DoA and the Department of Livestock Services (DLS) district offices in all the 75 districts of the country. Each district office operates through a network of 4 to 5 service centers each of which covers 2 to 4 VDCs. Table 2.7 presents the current extension coverage by the two departments. Considering the country's difficult terrain, physiographic situation, limited transport facilities and physical infrastructure, the extension workers certainly appear to be overstretched in terms of their workload (Chapagain, 2010).

Some of these gaps in extension coverage have been addressed by private voluntary organizations providing extension services. For instance, the Centre for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED) has been implementing various projects in the area of agricultural extension related to high value crop cultivation, pest management, seed production etc. Numerous donor funded programs are also underway, or in the process of being started, which provide some amount of extension on inputs, infrastructure and know-how relevant for enhancing the commercialization of agriculture. These include the Commercial Agriculture Development Project (CADP) of the ADB, Project for Agricultural Commercialization and Trade (PACT) funded by the World Bank, High Value Agriculture Project in Hill and Mountain Areas which is supported by the International Fund for Agricultural Development (IFAD). There is however scant information on the extension models that are currently being followed by these organizations in Nepal and their effectiveness and efficiency.

Table 2.7 Extension coverage of Department of Agriculture and Department of Livestock Services

Items	DOA		DLS	
	2007	2001	2007	2001
VDC per JT, JTA	2.54	2.15	2.70	2.47
Households per JT, JTA	3204	2713	3417	2893
Cropped Area (ha) per JT, JTA	2606	2166	NA	NA
Livestock Unit per JT, JTA	NA	NA	7161	6177

Source: Chapagain (2010). Note: JT stands for junior technician and JTA for junior technical assistant.

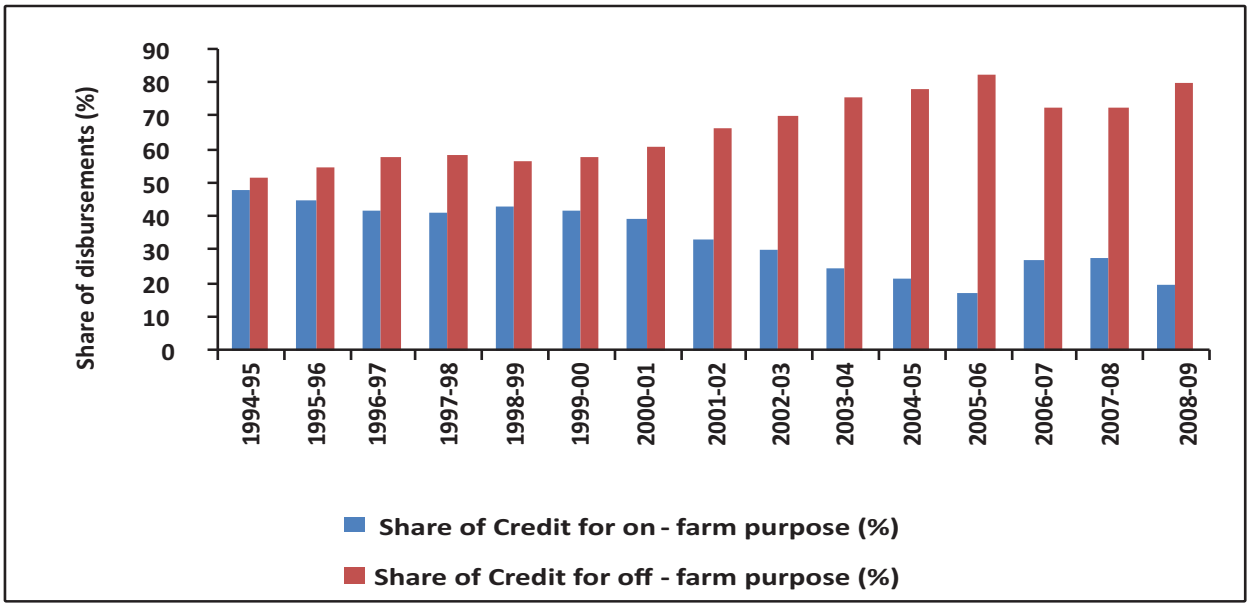
Agricultural Credit

The major formal financial institution for agricultural credit in Nepal has been the Agricultural Development Bank Ltd. (ADBL). While, the total credit disbursement by ADBL has been rising, an increasing share of ADBL's credit is towards off-farm purposes such as agro-industries, marketing and godowns (Figure 2.9). This might be an indication of increasing investment towards value addition in agriculture but a more detailed study would be required to assess if this has resulted in substantial inroads towards commercialization of agriculture. On the other hand ADBL's share of credit disbursement for on-farm purposes such as towards agricultural tools and irrigation shows a decline (in absolute terms though it does show an average growth of almost 5% from 2000/01 to 2007/08).

This trend might also be a reflection of the restructuring and recent changes that have been undertaken in the ADBL. After the enactment of Bank and Financial Institution Ordinance (BAFIO) in February 2004 all Acts related to financial institutions in Nepal including the ADBN Act, 1967 were abolished. Consequently, in line with the BAFIO, ADBL had been incorporated as a public limited company in 2005[9]. Following this ADBL underwent a process of restructuring with the divestment of government shares in ADBL and an increased emphasis on commercial banking operations. Some observers are of the view that this move might have led a reduction in ADBL's role in providing rural credit, especially for agriculture. This is an issue that requires closer analysis.

9 http://www.adbl.gov.np/general.php?page=brief

Figure 2.9 Credit disbursements by ADBL - share of credit for on-farm versus off-farm purposes (1994/95 to 2007/08)



Source: MoAC, 2009

Besides, the fact remains that overall penetration of formal financial sector in Nepal is fairly limited. Only 15.1% of households taking loans had done so from banks in 2003/04 down from 16.1% in 1995/96 (Table 2.8). The large percentage of loans was availed for household consumption and only 24.2% were taken for business or farm work purposes (Table 2.9). The major sources of credit were moneylenders and relatives indicating that formal financial institutions are yet to make substantial inroads in the household credit provisioning.

Despite various government efforts in recent years (priority sector lending requirements, licensing new types of financial institutions etc.) the formal financial sector has yet to sufficiently extend its reach in Nepal, especially in the rural areas. The findings of the 2006 Access to Financial Services Survey (WB, 2007) indicate that the use of banks is limited. Financial NGOs and cooperatives were found to be playing a large role in providing both deposit accounts and loans, and overall informal borrowing far exceeds formal borrowing in Nepal. The Survey reports that only 26% of Nepalese households had a bank account. The survey reconfirms the findings of the NLSS – II reported above, with about 38% of Nepalese households found to be having an outstanding loan exclusively from the informal sector and 16% from both the informal and formal sector, while only 15% of the households were found to have loans exclusively from the formal sector. Even more significantly the survey reports that financial access, as measured as the number of bank deposit and loan accounts per 1,000 people, was decreasing. The number of deposit accounts per 1,000 people had dropped from 113 in 2001 to 90 in 2005 and the number of loan accounts per 1,000 people fell from 19 to 10 during this period.

This is despite the exponential growth that Nepal has witnessed in formal financial institutions. In 1980 there were only 4 licensed financial institutions. By 2005 Nepal had 180. These included 17 commercial banks, 25 development banks, and 59 finance companies along with 4 microfinance

Table 2.8 Household borrowing characteristics – source of loans - 1995/96 and 2003/04

Percentage of Households:	1995/96 (%)	2003/04 (%)
Borrowing loans	61.3	68.8
Percentage of borrowing households taking loans from banks	16.1	15.1
loans from money lenders	39.7	26.0
loans from relatives	40.8	54.5

Source: CBS, 2005

Table 2.9 Household borrowing characteristics –purpose of loans - 1995/96 and 2003/04

Percentage of Households:	1995/96 (%)	2003/04(%)
loans for business or farm work	28.7	24.2
loans for household consumption	49.4	46.5

Source: CBS, 2005

development banks, 5 regional rural development banks, 20 financial cooperatives, and 47 financial intermediary nongovernmental organizations in the regulated microfinance sector (Ferrari, Jaffrin, & Shrestha, 2007).

While the number of institutions mushroomed, the financial status of these remained weak. In 2005 commercial banks (public and private) had an average capital adequacy ratio of –6.3% and nonperforming loans of 19%. Banks in the private sector performed better than public ones, but they also exhibited weaknesses. In 2005 the average capital adequacy ratio for private commercial banks was 11.4%, and nonperforming loans averaged 5.3%. The financial status of the institutions in the non-bank financial sector was also not very strong (ibid).

The issue of credit, especially for agriculture, is crucial. The situation in Nepal suggests that measures are required at the ground level in terms of greater reach and penetration, along with measures for stabilizing the overall financial health of these institutions as well.

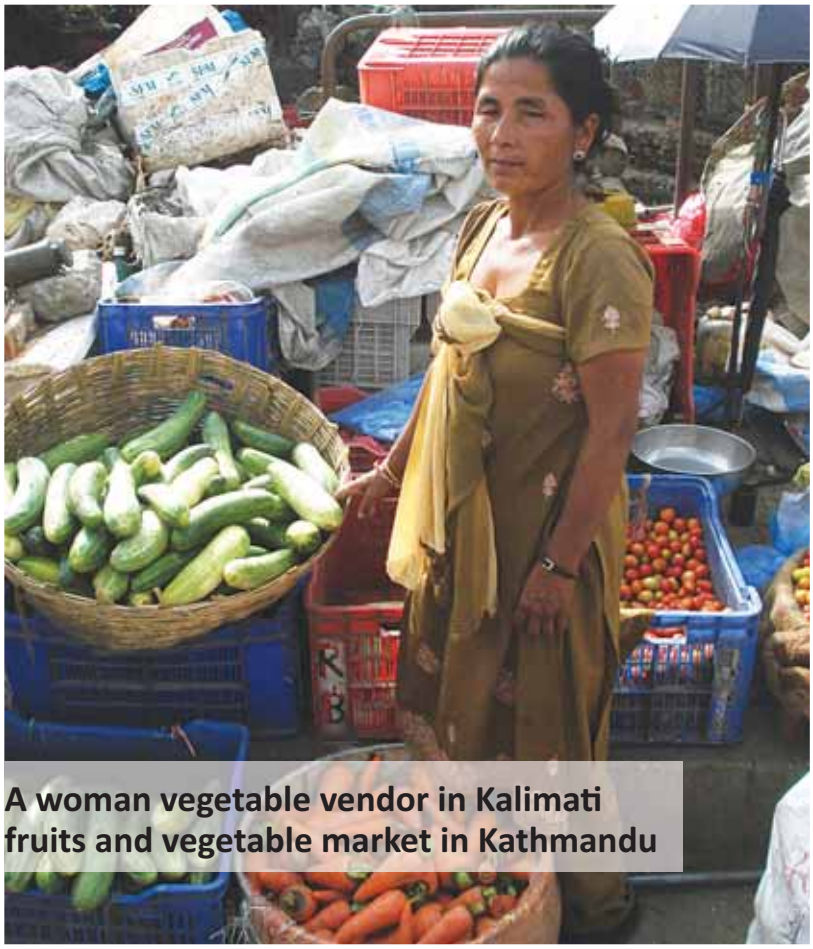
Output Marketing: Policy Landscape and Institutional Arrangements

The previous sections presented a brief picture of the changing structure and performance trends in Nepal's agriculture and an overview of the inputs scenario. Before looking at the output scenario it would be pertinent to recall a few important characteristics of Nepal's agriculture that have a bearing on the output market structure.

As mentioned before, the majority of Nepal's agricultural sector is characterized by smallholders. In addition the productivity as seen in yield levels is also low for most crops. As a result marketable surplus for most farms would be limited or even absent. Estimates of the share of output marketed from sample surveys throw up very low percentages - 21% for paddy, 26% for wheat, 34% for potato, and 43% for vegetables (NLSS-II, 2003/04)[10]. The marketing system and infrastructure has to accommodate these small volume of surpluses spread over a large number of producers whose average farm sizes are small. The role of aggregators at village/district level is important and would from a key link in the farmer to consumer chain. These aggregation activities could be carried out by private agents, co-operatives or government agencies depending on the contextual factors.

[10] This is the latest year for which reliable estimates are available with regard to marketable surplus at farm level.

With hardly any value chain studies available in existing literature on Nepal, there are major knowledge gaps pertaining to the current storage and processing practices, and infrastructure for various commodities. Post-harvest losses could also be a significant factor hampering agricultural value chains in Nepal. However, currently, there are no reliable estimates of these losses and further studies researching these aspects are required.



A woman vegetable vendor in Kalimati fruits and vegetable market in Kathmandu

The important contextual factors in Nepal's case that could affect agricultural marketing are (a) the constraints to physical accessibility posed by the terrain as well as under developed road and transport infrastructure, and (b) both official and unofficial agricultural produce trade across the open border which may impact competitiveness of domestic produced commodities (through the subsidies on agriculture and government administered minimum support prices in India). Variations in these effects across Nepal may necessitate strategies which are tailored to suit the local regional conditions.

Traditionally Nepal's agriculture structure was dominated by cereals – rice in *Terai* and maize in Hill and Mountain regions in the monsoon season, wheat and other cereals in the winter season. But, as seen earlier there has been a shift towards diversification in to high value agriculture. For the marketing system to exploit this potential requires grading, processing and packaging facilities and measures to deal with the seasonality of produce and fluctuation in market prices (Acharya, 2003).

Marketing strategies and activities of various agencies involved have to take into account these specific characteristics and government policy and regulatory framework has to be geared towards addressing these needs.

Government Agriculture Marketing Regulations, Pricing and Procurement Policies in Nepal

Government policy and interventions in agriculture markets in Nepal was largely concentrated around cereals. The Agriculture Marketing Corporation (AMC) set-up in 1971/72 was charged with the responsibility for both input and output distribution. It was set-up after a need for a national level agency to monitor and undertake procurement and supply of agricultural inputs and

outputs was felt following droughts and excess rains especially in the Hills and remote areas which affected agricultural production as well as food grain supply (Pyakuryal, Roy, & Thapa, 2010). Its twin objectives were stabilizing food prices and to increase agricultural production by providing incentives to producers. By 1974 the AMC was split into the Agricultural Input Corporation which dealt with input sourcing and distribution and the National Food Corporation (NFC) which undertook procurement and distribution of food grains. The NFC procured food grains at a fixed price which was usually decided upon taking into account the Minimum Support Price (MSP) that was announced for procurement by the Indian government. Following the government's liberalization measures in the mid-1990s the NFC's role has been reduced and operations on both procurement and food grain supply front have been cut back.

NFC procurement of wheat and paddy at MSP was finally discontinued since the Tenth Plan (2002-07) and since then it procures food grains at market prices usually from traders and open markets. It uses its own procurement along with food aid received from international agencies to supply in around 30 districts which have no road connectivity. Its share in the grain trade has however been minimal, with less than 1% of total production of principal crops[11] being procured through its operations during mid-1990s and continuing to fall in recent years (Figure 2.10).

Pyakuryal et al (2010) also note that after procurement from farmers at MSP was discontinued by NFC and with greater reliance on procurement from open markets there has been a decline in food procurement quantity which has led to a decline in the stocks and godown capacity utilization. The lack of adequate funding for food grain purchase and public sector procurement rules and regulations could also be constraints to effective functioning of the NFC (NTWG, 2007).

With respect to laws governing agriculture and agriculture marketing it has been noted that while Nepal has extensive laws, regulations, orders etc. pertaining directly to various aspects, there is 'neither a policy to ensure that producers and traders compete freely nor to prohibit connivance and cartels in the domestic market' (UNWFP-FAO, 2007). Currently the main government body responsible for policy and regulation of agricultural marketing in Nepal is the Agribusiness Promotion & Marketing Development Directorate (APP & MDD) housed within the MoAC. It is responsible for marketing infrastructure, formulating market rules and directives, suggest price policy formulation for agricultural commodities and also entrusted with the responsibility of export promotion. The APP & MDD has under its wing the government market yards of which there are 9 wholesale markets, 30 collection centers and 1056 local *haat*[12]. The individual market management is entrusted to Agricultural Produce Market Management Committee (APMMCs) which is made up of elected representatives of the traders, producers and other stakeholders availing the market facilities.

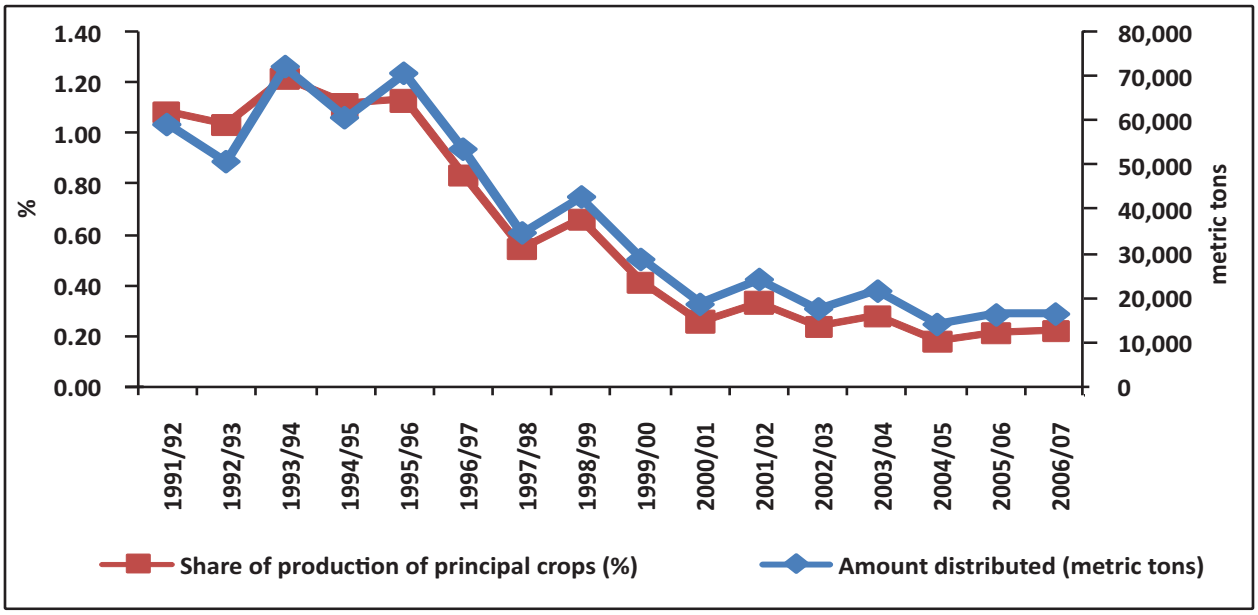
Private Sector Role and Participation in Agricultural Marketing

With the role of public agencies in food grain markets being minimal, it is seen that private traders and millers play a major part in the domestic grain market and are also the main players in the grain import and trade markets. The private sector is also a supplier of food grains,

[11] Even if it is assumed that the marketable surplus is only about 25% for cereals on average, the NFC's share would amount to only around 4%.

[12] Weekly markets held at a village or group of nearby villages

Figure 2.10 NFC - procurement and distribution operations 1991/92 to 2006/07



Source: NTWG, 2007

edible oils, pulses and sugar to state trading agencies involved in public distribution and also for institutional buyers such as the military, police etc. Currently, according to information from the Federation of Nepalese Chambers of Commerce & Industry (FNCCI), there are an estimated 430 mills in the private sector.

Local traders at village level (usually called *kantawallahs*) serve as the link between farmers and the food grain millers who form the main link to the wholesale markets. In the case of paddy, a 2006 survey of wholesalers across Nepal found that almost 70% of their rice is sourced from millers (UNWFP-FAO, 2007). A number of informal transit markets along the major trade networks within the country serve an important role in providing the forward and backward linkages for trade between the *Terai* and the Hill and Mountain regions. Some studies of the food grain market in Nepal have found that the food grain trade is mainly controlled by a few large traders and millers (ibid).

In the case of fruits & vegetables the role of government is limited to provision of infrastructure in the form of market yards – the largest one being the Kalimati fruits & vegetable market which serves the main demand centre of Kathmandu. In addition private market yards for specific commodity categories have sprung up largely from private initiative and investment. It was reported that there were a total of 33 market centers for fruits and vegetables, 21 collection centers, 8 wholesale markets and 4 retail markets constructed under government initiatives, while there are numerous other markets started and managed by private traders (for instance Harsha Fruit Market, Balkhu and Kishan Bazar Sewa, Tukucha) (Awasthi, 2007).

Considering the rapid growth in Fruits and Vegetables (F & V) as well as Nepal's natural advantage in other high value products such medicinal herbs and essential oils direct linkages between private sector agro-processing companies and farmers through appropriate

arrangements/contracts could help raise returns to farmers. One such model operating in Nepal is the Medicinal Plants Project of Dabur Nepal in Mountain regions of Nepal. Through this the company provides saplings to farmers (routed through local community development agencies) and the plant produce is bought by Dabur Nepal at prevailing market prices. The company also states that it provides technical support for cultivation and processing of these plants by local farmers themselves[13]. However the farmer has the right to sell the produce on his own to any other buyer. Dabur Nepal also has another model of lease cultivation wherein the farmer provides land and irrigation, the company undertakes the planting, the costs are deducted from the total value of produce and the balance is divided with the farmer's share being 50% of the net returns (ARD-RAISE, 1999). Lessons from this and other such experiences could help in designing new policies and regulations and/or modifying existing ones for providing a suitable environment which can aid direct linkages.

Co-operatives in agricultural marketing, especially in fruits and vegetables and dairy hold much potential. Nepal has witnessed a rapid growth in village level primary co-operatives dealing with various commodities – F & V, dairy, coffee etc, as well as other co-operatives undertaking other activities such as savings & credit services and consumer co-operatives. The Government of Nepal had passed a new Co-operative Act in 1992 following which the co-operative sector seems to have shown a substantial increase. The number of registered co-operatives had grown from 830 in 1990 to 9362 by 2007 (MoAC, 2007) Out of this there are nearly 1500 dairy co-operatives and more than 1100 agriculture co-operatives.

The co-operative system in Nepal is organized around a three-tier structure. The primary cooperatives at the village level are federated into sector-specific cooperative unions at the district level of which there are 72 and the district unions are in turn federated into 5 central cooperative unions (one each for dairy, coffee, fruits and vegetables, consumers, and savings and credit). The nodal representative agency for at the national level is the National Cooperative Federation (NCF). According to the NCF there are 1.2 million members in these cooperative organizations with women members forming nearly one-third out of the total membership. NCF also estimates the contribution of the cooperative sector to GDP to be around 1% (NCF Nepal, 2007). However, not much is known about the funding pattern of these co-operatives. This is critical to determine if indeed the co-operatives are able to function independently. Dominance by a few large farmers or dependence upon funding from external agencies including the government or donors may impact their autonomy and ability to cater to the interest of the members.

A major initiative in Nepal directed at increasing private participation in commercial agriculture and agro-processing has been the USAID and Federation of Nepalese Chambers of Commerce & Industry (FNCCI) promoted Agro Enterprise Centre (AEC). The AEC was setup in 1991 with the stated objective of 'expanding and strengthen market oriented private sector driven agro enterprises in order to increase the value and volume of high-value products sold domestically and internationally'[14]. Its activities have been spread across areas such as support to agricultural

[13] http://www.dabur.com/Nepal-Medicinal%20Plants%20Project (accessed 30th June 2010)

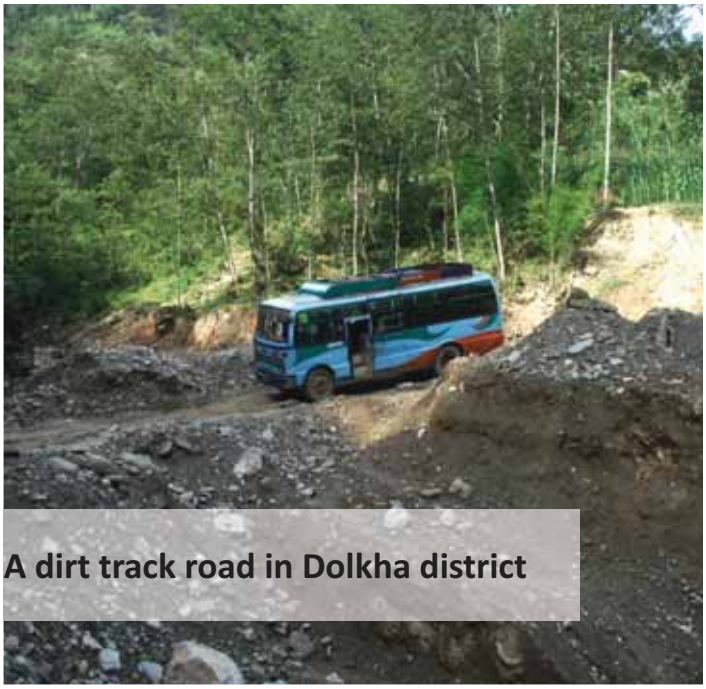
[14] http://www.aec-fncci.org/ (accessed 30th June 2010)

marketing and processing (through feasibility studies/business plan etc.), institutional and program support to commodity associations and groups, policy advocacy etc.

In recent years the role of the private sector has spread to other important functions too related to food and nutritional security. These include production of weaning foods for school feeding programs of various donor agencies, wheat flour fortification with iron for nutritional supplementation etc. The private sector can also prospectively play a stronger role in strengthening food and nutritional security through effective partnering with the government, consumer associations & consumer cooperatives and with bilateral/multilateral donors.[15] Over the years various policies of the government, starting with the Agricultural Perspective Plan, have underscored the need for increasing commercialization of agriculture. The new Agricultural Policy (2004) of the government and the Agro Business Promotion policy (2007) also gave a fillip to encouraging private participation in agriculture. While private traders or co-operative organizations have an important role to play, they by themselves cannot overcome an important constraint to agricultural inputs and output marketing in Nepal - the lack of basic rural infrastructure.

Infrastructural constraints: Roads & Power

Rural infrastructure, especially road connectivity is a key factor in raising agricultural incomes and poverty reduction (Fan, Hazell, & Thorat, 1999). With nearly 35% of its area in Mountainous regions and another 40% in Hill regions, the undulating terrain is a major challenge to developing transport infrastructure in Nepal and the lack of physical access not only impacts the income side (due to the affect on agricultural inputs and output linkages) but also poses difficulties on the demand front for supply of food. This aspect is touched upon in detail in the subsequent sections dealing with the 'access' aspect of food security.



A dirt track road in Dolkha district

In recent years there has been a substantial increase in road connectivity (Figure 2.11). Between 1995 and 2002, the total road network increased 6.7% a year, from about 11,000 km to 17,000 km- district and rural roads experienced the largest expansion, growing an average of 11% a year. However there is still a large gap as evidenced by the fact that out of the 75 districts in Nepal, 9 districts and 11 district headquarters are yet to be connected by road (NTWG, 2007). Also the lag in road infrastructure in Nepal becomes even more evident when compared to neighboring mountainous Indian states of Himachal Pradesh and Uttarakhand. These

[15] The authors' gratefully acknowledge inputs related to role of private sector in Nepal from Dr.Deva Bhakta Shakya

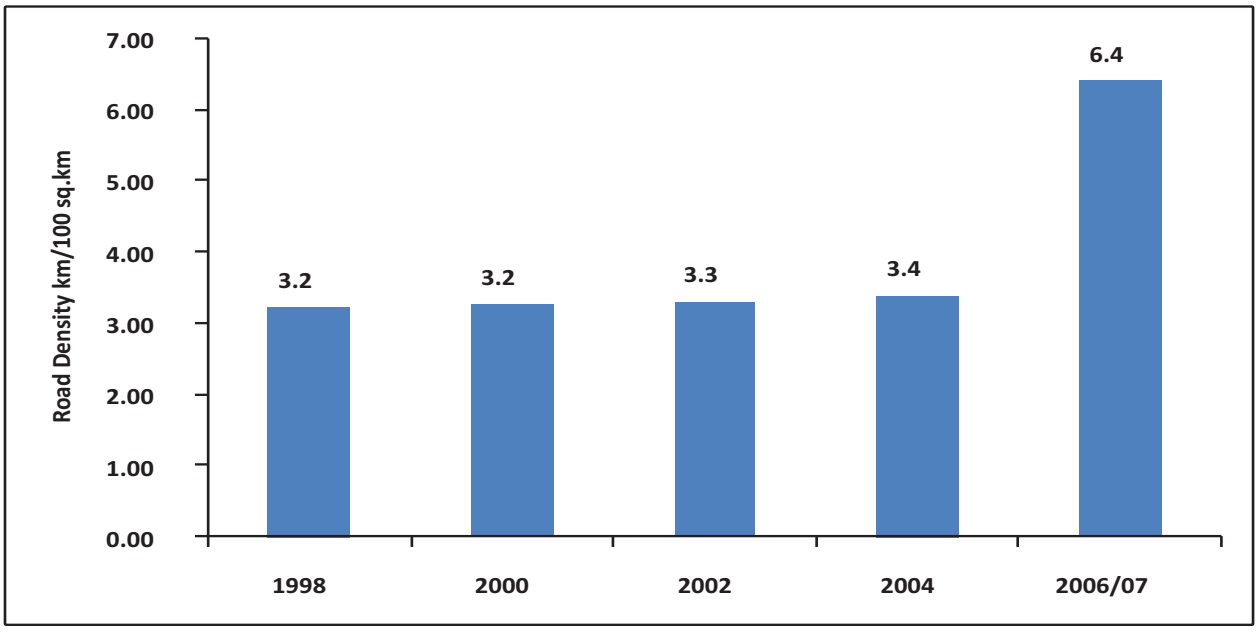
two states had a road density of 58.5 and 133.6 km of roads/per 100 sq.km of area respectively compared to 6.39 km/100 square km in the case of Nepal[16].

Access to electricity is also low with only 50% of rural households reporting that they used electricity for lighting in a 2008 survey (Figure 2.12). Electricity availability can be a determining factor in the development of ground water irrigation systems. It is also crucial for supporting the development of cold storages and other agro-processing activities in the value chain that can enhance value addition for Nepal's agricultural output.

Addressing both connectivity and rural power constraints in Nepal requires innovative, cost-effective solutions. In the case of rural power in recent years community based micro hydro power projects have shown promise to harness the vast hydro power potential that Nepal possesses through a decentralized, local level system (Ghimire H. K., 2008). The Government of Nepal has been running a subsidy scheme[17] to support development of micro hydro projects.

However, for meeting the overall power needs of the country, it is essential to tap the vast hydro power resource that Nepal possesses. The estimated potential exceeds the maximum possible demand for power in Nepal, and in fact hydro power generated in Nepal can contribute substantially towards meeting the power deficits in neighboring countries. Given that many of the rivers of Nepal flow across its border with India and on to even Bangladesh, regional collaborations are imperative in order to successfully harness this resource for the mutual benefit of Nepal and its neighbors.

Figure 2.11 Road densities in Nepal in km of road per 100 sq. km of area

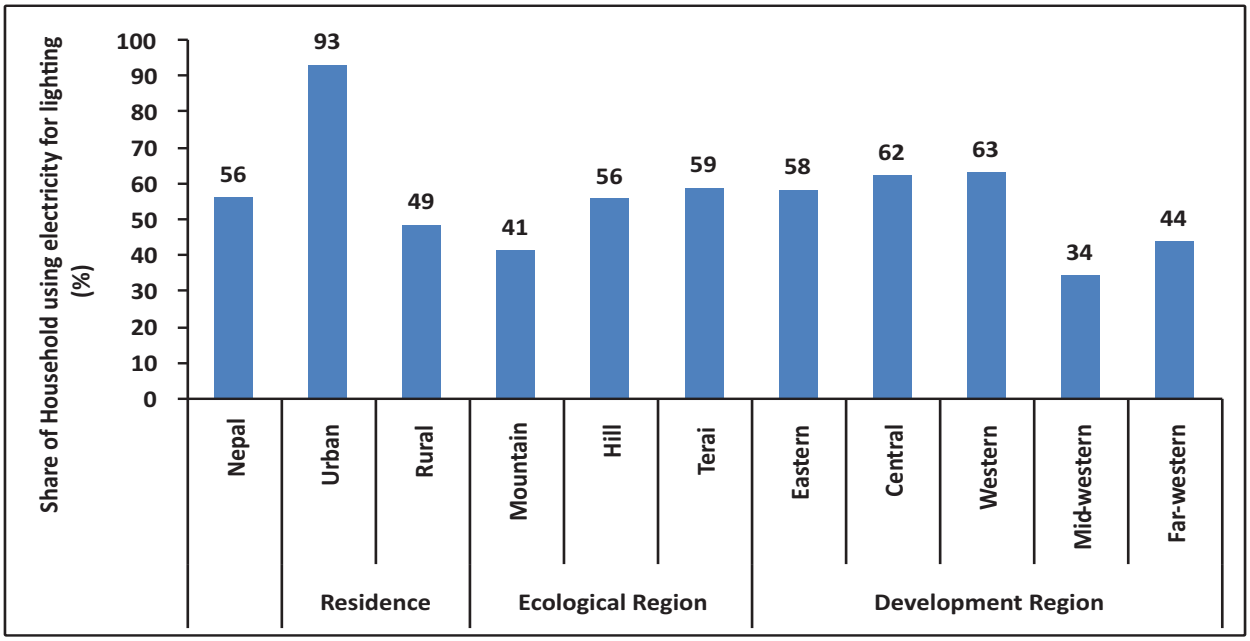


Source: DoR, 2008

[16] Road density for Uttaranchal and Himachal Pradesh based on data from MoSRTH, GoI, 2007

[17] From 2000 and revised in 2006

Figure 2.12 Households using electricity for lighting



Source: CBS 2008

Investments in Agriculture and Infrastructure

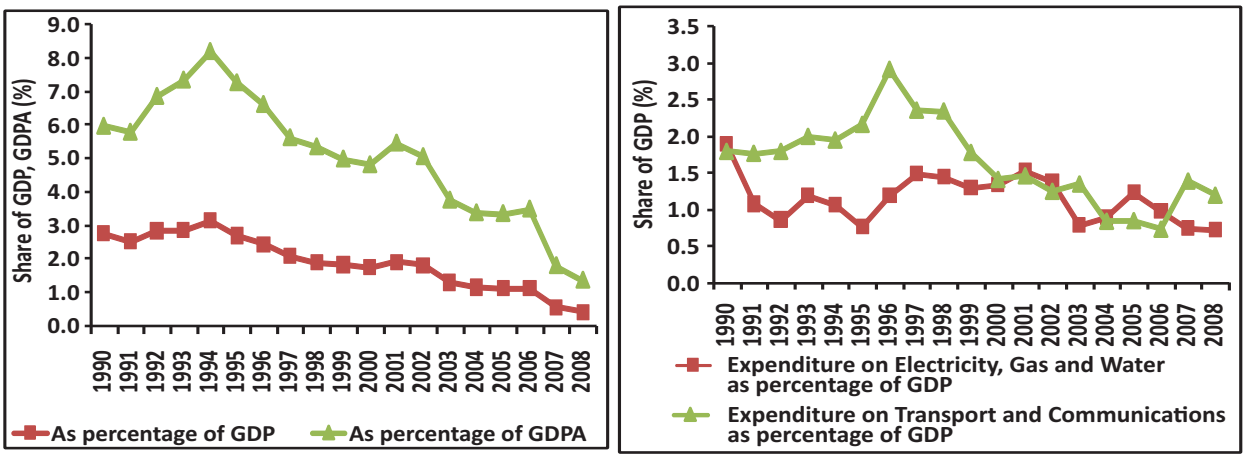
The Agriculture Perspective Plan has been the basis for most of the agricultural sector planning process in Nepal in the last couple of decades. The APP map for agricultural growth relied on a large public investment program for a technology-based green revolution in agriculture (ANZDEC, 2002). However, the share of public investment in agriculture as well as the share of public investment in infrastructure in Nepal has been showing a declining trend (Figure 2.13 - a & b).

The five year planning process in Nepal has been suspended and current planning exercise is limited to three year interim plans and annual plans. This has left a policy vacuum in terms of strategic vision and long-term perspective for the agricultural sector in Nepal. The World Development Report 2008 notes that *"…Agriculture has special powers in reducing poverty…* cross country estimates show that GDP growth originating in agriculture is at least twice as effective in reducing poverty as GDP growth originating outside agriculture. For China, aggregate growth originating in agriculture is estimated to have been 3.5 times more effective in reducing poverty than growth rate outside agriculture...for Latin America 2.7 times more" (WB, 2008). Agricultural productivity growth and raising rural incomes is a crucial aspect in addressing the food security concerns in Nepal.

Climate Change Challenge

Climate change poses an important challenge for Nepal with its Mountainous eco-systems especially vulnerable to even slight changes in the environment. In the period 1975-2006 Nepal's temperature has increased by 1.8^{0}C and the average temperature rise recorded was 0.06 ^{0}C per year. The temperature rise was higher in the Mountain regions with the average temperature increase being 0.08 ^{0}C/year in the Himalayan regions compared to 0.04^{0}C/year

Figure 2.13(a) Public expenditure on agriculture as share of GDP and GDPA 1990-2008 (b) Public expenditure on power, transport and communication as a percentage of GDP 1990 – 2008



Source: ADB, 2009

in the *Terai* (Malla, 2008). According to the International Centre for Integrated Mountain Development (ICIMOD), warming in Nepal is on average at 0.6 degree centigrade per decade, higher than the global average (Shrestha A B, 1999).

While the possible impact that climate change would have on agricultural systems is not yet known fully, it is suspected that there might possibly be some positive impacts due to increase in photosynthetic processes, better soil microbial activities etc. But at the same time it is also highly likely that there would be sizeable negative impacts on agriculture, compounded in Nepal's case due the higher sensitivity of its ecosystems to climatic factors. Temperature rise at higher altitudes could lead to melting of glaciers increasing the possibility of catastrophic glacier lake outburst events. The increased run-off would also lead to increased frequency of flooding in the areas downstream, within Nepal as well as across the border in the neighboring countries (Webersik & Thapa, 2008). Changes in the climate could also have direct impacts on health of the populace; as a recent ICIMOD report on Climate Change in the Himalayas (Shreshta, 2009) notes:

> Climate change can affect people's wellbeing in a variety of ways. It is likely to exacerbate the existing food insecurity and malnutrition. Vector-borne diseases such as malaria and dengue fever are likely to move to higher altitudes. Water-borne diseases are also likely to increase with the increasing water stress accompanied by the lack of safe drinking water and basic sanitation in the region. Deaths and morbidity associated with extreme and erratic weather are also likely to increase. Climate change will have differentiated impacts which could be more severe for women, and poor and marginalized groups.

Some recent surveys have attempted to record effects of climate change that are already visible based on interviews with vulnerable communities in Nepal. For instance a report by the *Institute for Social and Environmental Transition- Nepal* has highlighted some of the changes reported by farmers in the hills and mountains including: increasingly erratic monsoon rainfall; reduced winter snow fall; increased landslides; and shortened flowering and fruiting

period for some plants. In the *Terai*, the report notes that farmers have experienced flooding events that have become more frequent and more destructive in their intensity. The *Terai* farmers also report an increase in frequency of crop loss causes by disease and insect infestation (UNWFP, 2009 & NCVST, 2009).

Finding cost-effective, sustainable strategies for adapting to climate change must remain a priority for Nepal's researchers and policy makers. Successful local level examples of coping and adaptation need to be evaluated, and effective partnerships between the government, aid agencies, civil society organizations and local community need to be built to upscale these local level successes. Also the nature of the problem requires that joint efforts need to be undertaken at a regional level as climate change outcomes in Nepal could have significant impacts on neighboring countries too.

2.5 Concluding Remarks: Constraints to Enhancing Agricultural Performance

In summary, this report finds that with regard to food availability and the performance of domestic agriculture, Nepal has exhibited some positives while several constraints still remain. Overall the agricultural sector does show a relatively better growth rate (of 3.3% per annum for the period 2001-07) compared to other countries in the region, albeit with some volatility. However, considering the high rate of population growth and the sizeable share of population employed in agriculture, enhancing agricultural productivity and performance is crucial for raising per capita income levels. The cereals sector has witnessed a slowdown in growth in recent years except for the case of maize. It is the high value sector of Nepal's agriculture (F&V, livestock etc), on the other hand, that has been on higher growth trajectory.

Sustaining this good performance requires that several challenges on the input as well as the output side need to be tackled. The input side constraints are marked by bottlenecks in supply of improved seed and adequate fertilizers, and slow growth of irrigation. On the output side marketing bottlenecks include infrastructural constraints and lack of adequate private sector participation in transport, agro-storage and agro-processing. The other set of challenges for Nepalese agriculture are those posed by climate change and its impacts along with an increasing risk of severe weather events such as floods.

The relative importance of each of these key constraints to increasing availability and enhancing agricultural performance needs to be studied in greater detail so that it can provide evidence based inputs for a regionally differentiated, prioritized investment strategy. Improving agricultural performance is not only essential for increasing food supply, but also to raise incomes in order to address the question of economic access to food which is examined in the next section of this report.

Employment generation – both on and off the farm – is the key to improving access to food

3 | Economic Access and Food Security in Nepal

- Nepal's poverty headcount ratio (PHCR) has shown one of the highest rates of decline among South Asian countries at 1.4% points per annum during the period 1995/96 – 2003/04.
- Rural PHCR remains thrice as high as the urban poverty levels at 30.8% (2003-04) and the agriculture sector shows highest concentration of poverty.
- Agriculture sector employs nearly 70% of the workforce and remains the primary source of income for majority of the households making growth in agriculture crucial for raising income levels.
- Income from remittances has grown in size and importance in recent years making contributing more than 20% of the GDP of Nepal.
- Food is a major item of expenditure, especially in Mountain regions and rural areas, and food price inflation has been significant (to the tune of 16.7% in 2008/09).
- There is evidence of change in consumption preference, with cereal intake being either stagnant or declining, while consumption of high value products is increasing.
- Lack of infrastructure and physical connectivity pose a problem for food supply and access in numerous districts, especially in the Mountain belt.
- Safety nets in Nepal are largely confined to numerous donor aided programs and there is a need for rigorous, independent evaluation of the programs in existence and for mapping out an integrated strategy based on research evidence.

Economic access or the ability of a household to afford food is broadly influenced by the ability of the household to purchase food (and non-food) items in the market and the relevant prices. In Nepal's case, the transportation linkage among regions also plays an important role in determining the availability and prices of various products. Finally, some government programs may help improve the degree of economic access to food. For example, programs that promote employment/income generation increase purchasing power of participant

households; some programs stabilize/bring down prices of food items and link them to markets through distribution of subsidized food. This section briefly examines economic access for food security from these four angles in the following order- poverty reduction, employment and incomes, consumption and prices of food and non-food items, access challenges due to terrain and finally safety nets and various programs in place that facilitate greater economic access of the poor and vulnerable to food.

3.1 Poverty, Employment and Incomes

Poverty Trends and Incidence

National poverty estimates (based on consumption expenditure on various food and non-food items) indicate poverty has declined quite significantly during the mid-nineties to mid-2000 period. The poverty head count rate (share of population living below the national poverty line)[1] declined from 41.8 to 30.8 during 1995/96 to 2003/04 by around 3.7% per year (CAGR) or 1.4% per annum on a percentage point basis (Table 3.1). During this period the overall economy of Nepal grew at an average of 4.2% (GDP growth) while the agricultural sector (GDPA) grew at an average of 3.6% (World Bank, 2010). Remittances as a share of GDP also showed a large increase in this period. Workers' remittances and compensation of employees received grew from 1.2% of the GDP in TE 1995/96 to 11.6% of the GDP by TE 2003/04 and seem to have fuelled at least a part of the reduction in poverty (discussed later in this section). However further analysis is required to estimate which factors have contributed the most to this rapid rate of poverty reduction in Nepal.

From the data available this reduction seems to be largely due to a decline in the urban poverty rate that fell by 56% from 21.6 to just 9.6 from 1995/96 to 2003/04. Although rural poverty rate also fell by 20%, it still remains over three times higher than urban poverty rate at 34.6 in 2003/04. Partly because the majority of the population is classified as rural, the concentration or share of the rural poor population to the total poor is much larger at 95%.

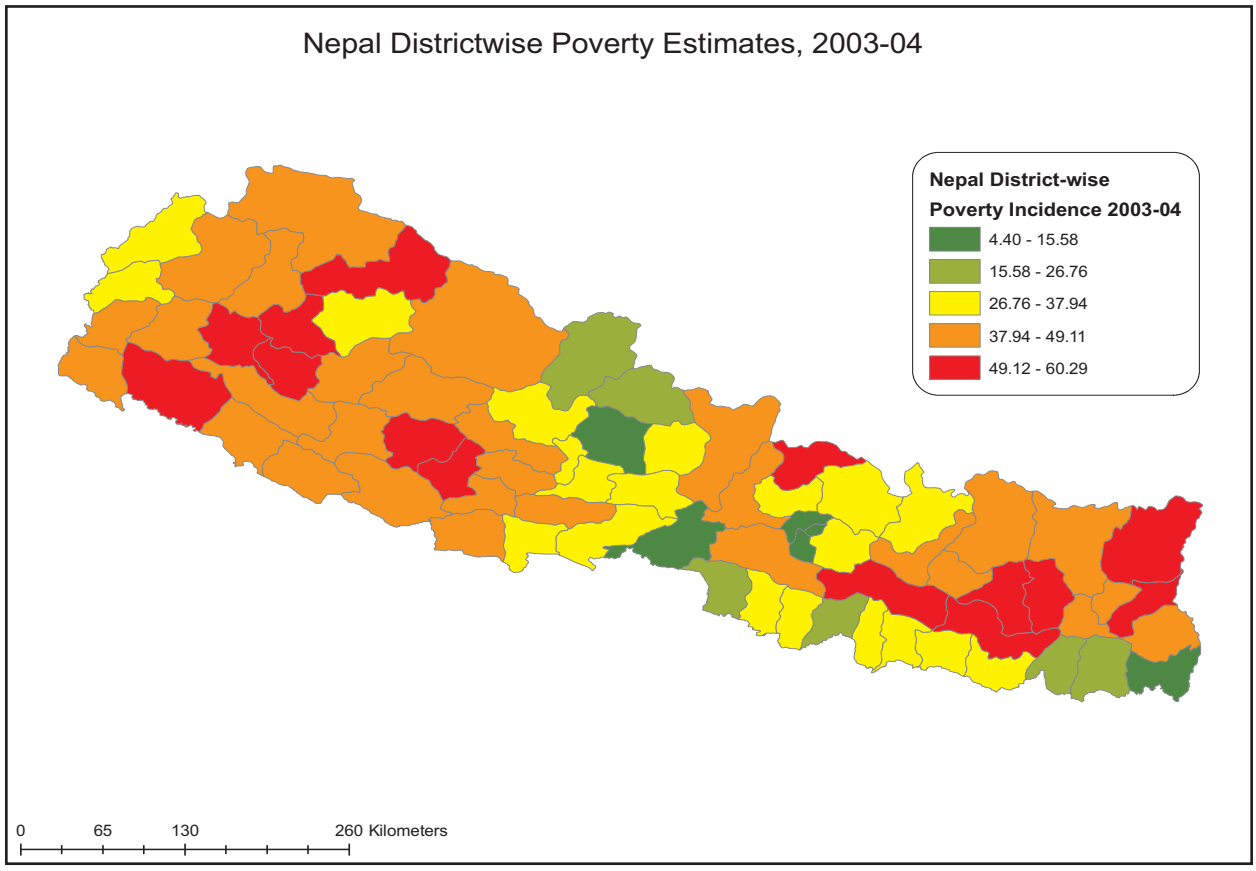
Table 3.1 Poverty headcount (%) and distribution of poor population (%) Nepal

Region	Sub-region	Poverty headcount (%)			Distribution of the poor population (%)		
		1995-96	2003-04	% Change	1995-96	2003-04	% Change
Nepal		41.8	30.8	-26	100	100	-
Residence	Urban	21.6	9.6	-56	3.6	4.7	30
	Rural	43.3	34.6	-20	96.4	95.3	-1
Ecological belts	Mountain	57	32.6	-43	10.7	7.5	-30
	Hill	40.7	34.5	-15	41.9	47.1	13
	Terai	40.3	27.6	-32	47.4	45.4	-4

Source: CBS, 2005

[1] Recent national poverty estimates are based on two surveys namely the Nepal Living Standards Survey (NLSS) 1 and 2, conducted in 1995/96 and 2003/04 respectively. Nepal's poverty line is derived from the 1995-96 NLSS-I using the cost-of-basic-needs method. Changes in the cost of living have been taken into account using region-specific price indices developed on the basis of the 1995-96 and the 2003-04 NLSS.

Figure 3.1 District-wise poverty incidence estimates (2003-04)



Source: Map generated by Authors' based on data from CBS et al (2006)

Given this, rural poverty reduction (or raising rural incomes) poses a primary challenge to increase economic access to food for the majority of the vulnerable population. Regional poverty estimates indicate a higher prevalence of poverty in certain areas. Hills and mountains are worse off, as are the mid-and far-western regions which lag behind the national average (refer annex Table 3A.1 for details). The map below also provides a snapshot of the distribution of poverty incidence across districts of Nepal (Figure 3.1). The poverty incidence figures have been drawn from the small area estimates of CBS et al (2006) which use the National Living Standards Survey - II (2003/04) data along with the Census 2001 data to generate poverty estimates at a district level.

While these statistics give us an idea of the poverty trends in Nepal across key regions and ecological zones, the incidence of poverty also varies by occupational group, land-holding size and sex of household head. The largest reduction in poverty head count rate has been seen in professional wage earners and self-employed in services and trade. Workers engaged in the agricultural sector (wage earners and self-employed) record the highest head count rates with the lowest percentage decline during 1995/96 to 2003/04. Based on poverty head count rate,

the majority of wage earners in agricult ure sector are estimated to be poor (nearly 54%) and this share has fallen only by 4% during the period. Though the period has seen a reduction of head count rates, across individual occupational groups (including the agricultural sector), the majority of the poor population is concentrated in the agricultural-sector and this has increased from 76.4% in 1995/96 to 77.8% in 2003/04. More specifically in rural areas, poverty estimates by land holding size reveal that poverty head count rates as well as the concentration of poor population amidst small and marginal land holders are the highest with the slowest reduction during 1995/96 and 2003/04 (Table 3.2, also refer Annex A3, Table 3A.2 for more details). Though an estimated 78.4% of Nepali households have access to land (CBS, 2006), increasing fragmentation and low productivity from agriculture especially amongst small-holders are reflected in this slow poverty reduction. Thus it is important to leverage land assets to provide a sustainable and remunerative income for smallholders to move out of the poverty trap.

Table 3.2 Poverty (%) and distribution in selected groups

		Poverty headcount (%)			Distribution of the poor population (%)		
		1995-96	2003-04	% Change	1995-96	2003-04	% Change
Poverty by employment sector of the household head							
Self-employed	Agriculture	43.1	32.9	-24	60.7	66.9	10
Wage earner	Agriculture	55.9	53.8	-4	15.7	10.9	-31
Poverty measurement by land ownership in Nepal							
Land Holding by Ha	Less than 0.2	48	39	-17	23	25	10
	0.2 - 1	45	38	-15	44	51	17

Source: CBS, 2005

Although Nepal has seen a rapid rate of poverty reduction at the national level, certain regions and groups are subject to high degree of poverty. Rural areas have seen much higher poverty than their urban counterparts, so have the Western Hill and Mountain regions. Secondly poverty has occupational and social dimensions - small holders, *dalits* and *Janjatis*. Workers in the agricultural sector seem poorer than those in the non-agriculture sector and larger shares of assets like land holdings seem to reduce the risk of poverty. These vulnerable regions/populations require more attention as sustainable employment and income growth is critical to eradicate poverty for food security. The next section thus briefly explores the structure and trends of employment and incomes and outlines some key emerging issues therein.

Employment and Income: Structure and Trends

The latest National Labor Force Survey (NLFS) (CBS 2008) indicates that of 11.2 million currently employed/working people, agriculture is seen to be the major sector of employment. Of the total currently employed (aged 15 years and above), 67% work in agriculture (56% of male and 77% of female workforce). As seen in the previous section, poverty incidence seems to be high among agricultural sector workers. This is partly because agricultural work remains predominantly subsistence based. Though the share of population employed in subsistence agriculture to total employment has dropped marginally from 67% in 1998/99 to 64% in

2008 (ibid), around 95% of the agricultural employment is in subsistence farming and only 5% in market agriculture (the latter also includes forestry and fisheries activities).

Estimates from the Nepal Living Standards Surveys indicate that for 74% of men workers and 94% of female workers in rural areas, agriculture is the main employer in 2003/04. The number of self-employed workers is much higher than wage earners and their share has increased from the mid-nineties. Those in the poorest two quintiles also have a slightly higher share of workers in the agricultural sector (76.5% of men and 96.4% of women workers in 2003/04). It is interesting to note that the share of self-employed in agriculture has gone up across the board, whereas wage workers in agriculture have fallen (for details refer Annex Table 3A.3). One of the reasons for this could be that after the out-migration of wage labor (especially male), remaining family members (in particular female labors) are forced to engage in agricultural activities on their own lands.

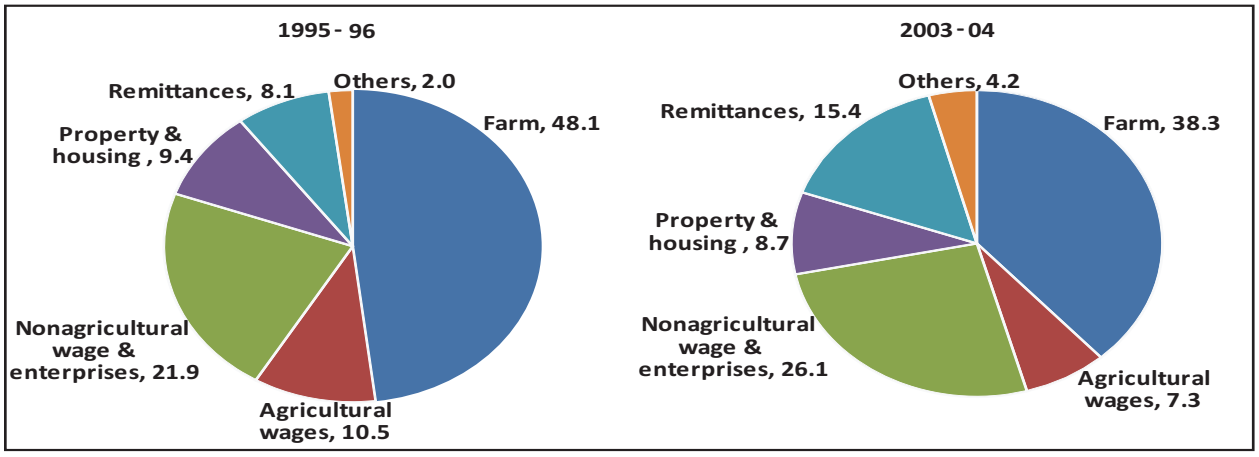
The second largest share of employment is in the non-skilled non-agricultural wage earnings sector (especially in urban areas, where it is the largest employer). The total share of non-agriculture sector has increased marginally for men in rural areas and for the poor, but actually declined in urban areas. Among women employed, the largest share is in the agriculture sector (even in urban areas) and has increased between the two periods due to rising self-employed women workers in the sector. In fact the share of non-agriculture employment among women has not changed much.

The employment statistics presented in this section refer to the main occupation of the population (defined in terms of majority work hours per sector per week), although persons undertake work in multiple sectors simultaneously. Given that agriculture remains the primary occupation of the majority of Nepali labor, it is critical that this sector is dynamic and remunerative in order to make a dent on poverty. Incomes from agriculture remain the foundation for many households, thus augmenting agricultural growth and productivity has a direct bearing on both national food availability and household purchasing power.

Agriculture remains the primary income source, constituting nearly 46% of total household income (Figure 3.2), despite a decline of 22% from nearly 60% in 1995/96 (considering incomes from farm and agricultural wages). This change has been fuelled by the growth of non-farm incomes especially remittance incomes from absentee household members. Incomes from property and housing have also increased in urban households, while the share from other income sources has only reduced. In rural areas share of income from other non-farm sources has also grown, namely income from non-agricultural wages followed by non-agricultural enterprises, although to a much lesser extent (refer Annex A.3, Table 3A.4).

Household income varies considerably across development regions, ecological zones, and wealth quintiles (Table 3.3 and further details in Annex Table 3A.5). Farm income is still a dominant source for the rural population, especially households living in the Mountains and households in lower income groups. According to 2003/04 NLSS data, 48% of household income comes from farm income, 28% from non-farm income, 11% from remittances and 10% from housing consumption. However, for households living in the Mountains, 59% of household income is from agriculture only against 19% from non-farm income and 9% from remittances. Similarly,

Figure 3.2 Share of income from sources in rural households (%)



Source: CBS, 2005

the poorest and second poorest groups, based on consumption quintiles, are also highly dependent on farm income- 62% and 58% respectively (CBS, 2005).

By far the biggest difference in the income pattern in Nepal has been the increasing share of remittances. The share of income from remittances among urban households has increased by 160% and by over 80% among the rural households during the period 1995/96 to 2003/04.

Table 3.3 Sources of household income (2003/04, % share)

	Farm Income	Nonfarm income	Remittances	*Other
Urban	13	54	10	23
Rural	55	23	11	11
Nepal	48	28	11	14

Source: CBS, 2005 Note: * Includes rental value of own house

Migration and Remittances

A few studies have suggested that income growth from remittances to be one of the key drivers of poverty reduction in Nepal (WB et al 2006; Hoermann & Kollmair, 2009; Lokshin et al 2007), especially in urban areas. Loshkin et al. (Ibid.) estimate that up to 20% of the poverty decline witnessed during 1995/96-2003/04 can be attributed to remittance inflows from migrant worker populations. World Bank et al., (Ibid,) estimate that poverty would have declined by 7.1% points instead of the observed 11% points if the incidence of remittances had remained unchanged between 1995-96 and 2003-04.

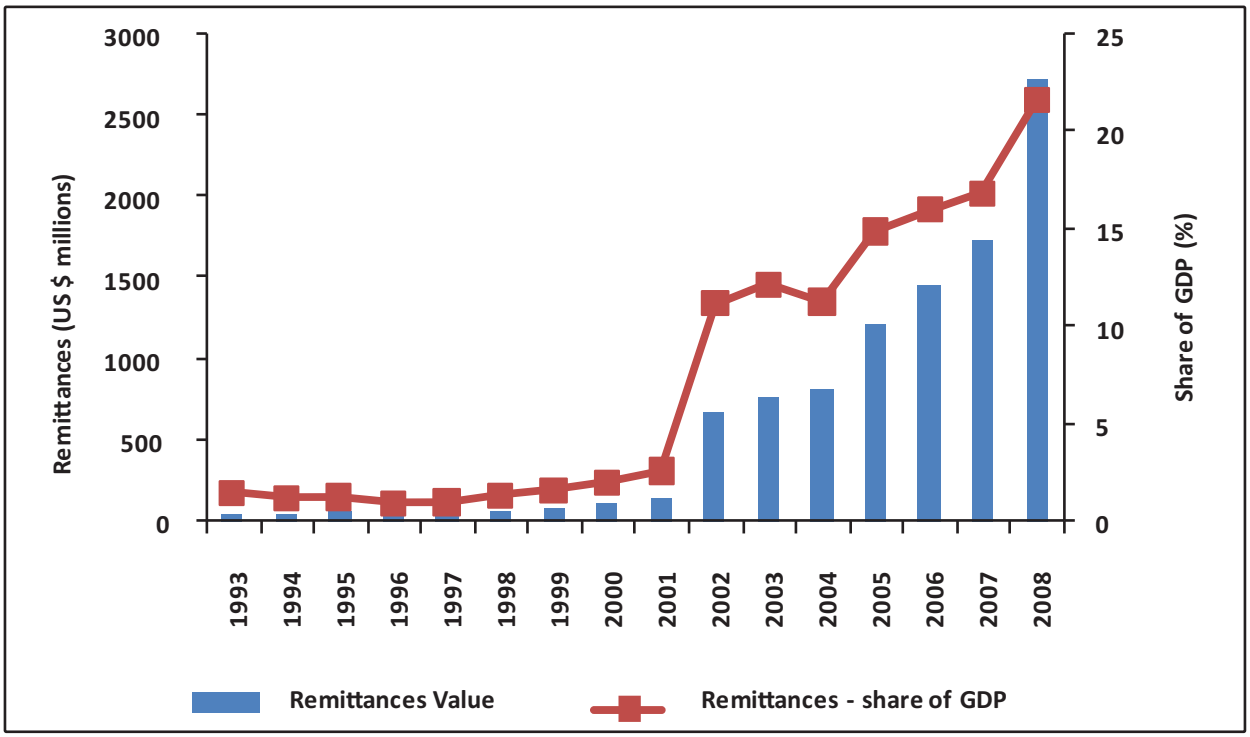
Labor migration and foreign employment have historically played a critical role in Nepali society, although its scope and nature may be changing in the recent period (Sharma & Gurung, 2009)[2].The conflict years, from the mid-nineties onwards, have seen political insta-

[2] Sharma and Gurung (2009) note; '… the first known foreign employment in the beginning of the eighteenth century during the process of national unification when an exodus of peasants left to work in the tea estates in Darjeeling and Assam of India. In the early nineteenth century, hundreds and thousands of Nepali hill people joined the British Army and fought on the side of the Allied powers both during the World War I and World War II. The beginning of the construction boom in the emerging economies in East Asia and the Gulf in the 1980s provided yet another opportunity for young Nepalis to venture out for foreign employment in pursuit of a descent and dignified life…'

bility and uncertainty, sluggish economic performance and in the more recent years energy crisis and unfavorable weather conditions (Ibid.). In contrast the rest of the developing world including Nepal's neighbors in South Asia and China, have seen relatively rapid growth in the economy and resultant economic opportunities. Domestic administrative reforms and decentralization in 2000/01 further opened up new markets especially in the Middle East, which boosted migrant outflows (Loshkin et al, 2007). Consequently, this period has seen rising remittance inflow into Nepal, from around 1% of GDP in early nineties to around 20% of GDP in 2008/09 (Figure 3.3) and remittances have become a critical income source to an increasing number of households and Nepal's macro-economy itself.

NLSS presents data on migrant workers in two points of time across regions, which helps capture the role of workers movements and remittances better. A closer look at share of migrant workers by destination of workers shows that around 39% migrated to India and 32% and 26% to other parts of rural and urban Nepal respectively. In 2003/04, these figures have changed- the share of workers to India declined marginally to 36% (due to greater movement of higher-income migrants to other countries; but simultaneously larger number of poorer migrants moved to India). The share of migrants to other countries increased by over 5 times to 16%, as share of internal migrants dropped (CBS, 2005). Nepal Labor Force Survey II (2008) estimates the present share of remittances received by households from outside is substantially higher at 83.2% against 16.8% from within the country. In terms of country distribution, remittances from within Nepal account for nearly 17%, from India

Figure 3.3 Workers remittances inflow in Nepal



Source: WB, 2010

A worker operating a wintergreen oil distillation unit

11%, Malaysia almost 16%, Qatar 18% and other countries 24%. Although India ranks lower here, India attracts the highest proportion of migratory workers with 26% (consistent with its share of remitters) but average remittance value is lower.

Farm and Non Farm Income

Apart from remittance earnings, rapid increase in real wages across sectors has also contributed to poverty reduction, albeit with variation in the rate and level across regions and groups. Non-agriculture skilled wages are the highest and have also seen the highest increase, especially in urban Nepal, of over 200% from 1995-96 to 2003-04 (Table 3.4). Wages from agriculture sector are the lowest in both periods, followed by wages from non-farm/agriculture unskilled labor. Given that these two wages experienced much lower growth the difference between skilled and unskilled (agricultural and non-agricultural wages) have widened considerably. The growth in real agricultural wages could be at least partly driven by tightening labor market due to a shift towards self-employed agriculture work or migration out of agricultural wage activities.

Wages disaggregated by sex indicate that women consistently receive lower wages across all categories. But interestingly, although agricultural-wages are the lowest in value terms for both sexes, they are the most equitable. Men's non-skilled agricultural-wages are 1.5 to 2

Table 3.4 Real daily wages from agriculture and nonfarm sectors, Nepal (Rupees in 1995/96 real prices)

	Agriculture			Non-skilled non-agriculture			Skilled non-agriculture		
	1995-96	2003-04	% Change	1995-96	2003-04	% Change	1995-96	2003-04	% Change
Urban	42	58	38	98	92	-6	138	461	234
Rural	44	55	25	79	98	24	81	135	67
Nepal	44	55	25	81	97	20	94	295	214

Source: CBS, 2005

times higher than women's wages in both periods, whereas men's skilled wages are 1.6 times to nearly 3 times higher than women's wages in 1995/96 and 2003/04 respectively (refer Annex A.3, Table 3A.6 for details).

3.2 Consumption

Available estimates on consumption of food items (from NLSS 1 & 2) indicate shifting consumption patterns in favor of high value products - including vegetables and fruits, livestock products as well as better quality rice, where consumption has increased across income quintiles (CBS, 2005). Cereal products like maize, wheat flour and coarse rice have shown a decrease (Figure 3.4) in favor of these better quality and more nutritious food, as incomes have risen. Average per capita consumption of coarse rice, which is the basic staple of most Nepali households has reduced marginally from 62.4 kg per month to 61.6 kg per month during 1995/96 to 2003/04, whereas consumption of wheat flour and maize have reduced by a larger percent from 22.4 to 19.2 kg/month and 2 to 0.9 kg/month respectively during the same period. But as intake of fine rice and maize flour has increased substantially by 46% and 31% (to 2.7 and 1.1 kg/month respectively) there is no clear movement away from cereals. The largest jumps have been in the livestock sector, especially poultry and fish consumption which have gone up by 100% and 47%, albeit from a very low base, and in potatoes where consumption has increased by over 30%. These changing consumption patterns have occurred across income groups- switchover to rice, vegetables, and animal proteins and fats were even higher among low-income households (CBS, 2005).

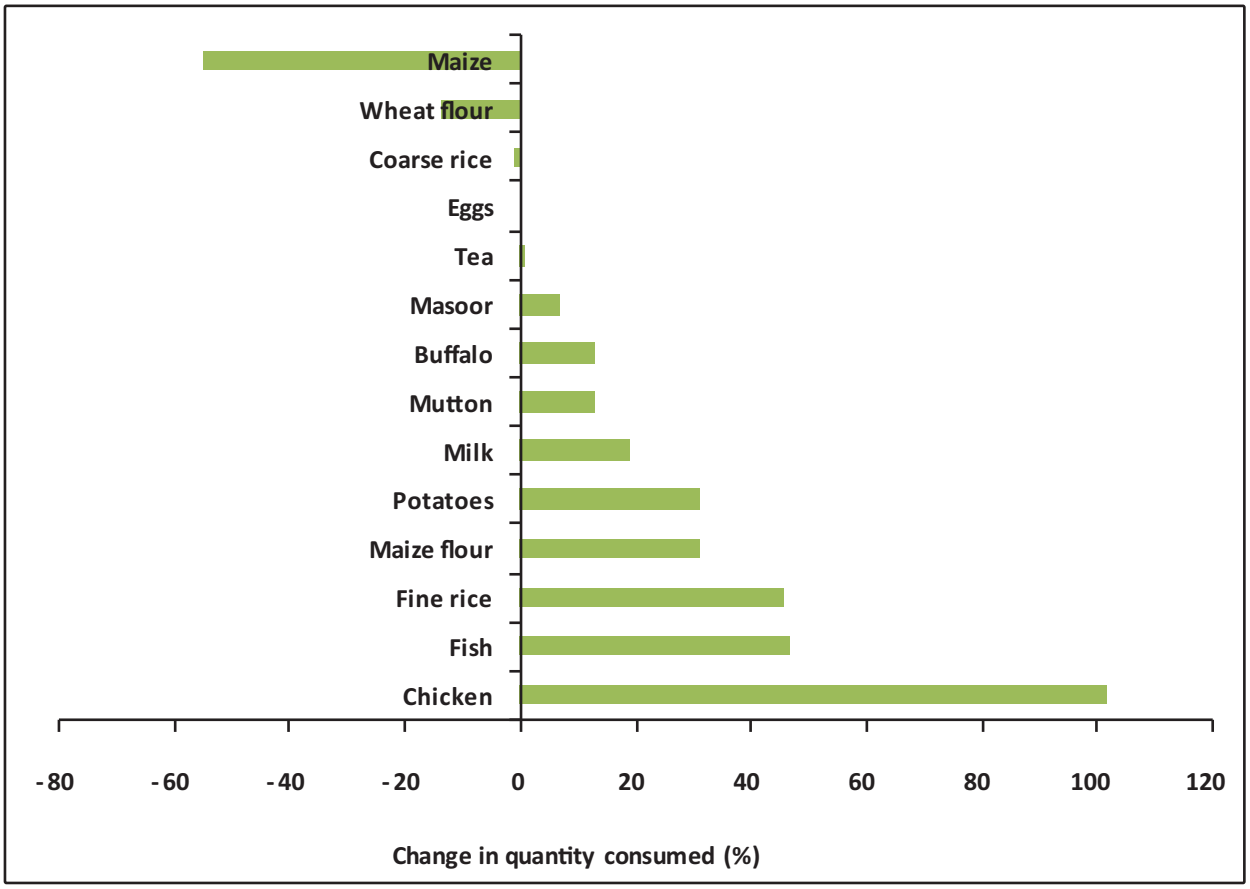
As incomes have increased and food preferences have changed, household expenditure on food and food items has gone down as a share of total expenditure. NLSS estimates food consumption from purchased and home produced foods as well as in-kind payments of food. More recent estimates on consumption expenditure by food item are presented in the Household Budget Survey (HBS), 2005/06 (NRB, 2008) (Table 3.5). These estimates are not strictly comparable to NLSS consumption expenditure data and differ significantly - for instance they include expenditure on hotels and restaurants, alcoholic beverages and tobacco. According to these estimates, grains and cereal products are the single highest food item group, constituting roughly 30% of the share of food expenditure. The next single largest group is livestock and fisheries products (the other category includes an assortment of items

Table 3.5 Share of average monthly household expenditure, by region (%) 2005/06

Food Item	Residence			Ecological Region			Urban Mkt Centre (KBL)
	Rural	Urban	Nepal	*Terai*	Hills	Mountain	
Grains & Cereal	32.4	29.5	30.7	30.5	30.6	33.3	29.4
Legume Varieties	4.3	4.1	4.2	4.7	3.9	4.1	3.7
Vegetables & Fruits	15.5	17.7	16.8	16.7	17.2	14.5	18.3
Livestock & Fisheries	19.3	19.2	19.2	19.2	19.1	20.5	17.5
Others	28.4	29.4	29.0	28.9	29.2	27.7	31.1
Food & Beverages to total Exp.	44.1	35.8	38.9	38.6	38.3	47.5	35.2

Source: NRB, 2008.

Figure 3.4 Percentage change in quantity consumed of key food items, 1995/96-2003/04



Source: CBS 2005

from ghee and oils to alcoholic beverages and tobacco etc.), followed by vegetable and fruits. This seems to be in keeping with the rise in consumption of these items.

The average share of household expenditure going by HBS 2005/06 on food to total expenditure is around 38.9% for Nepal, with a relatively higher share in rural areas and the mountain belt partly as these regions are much poorer[3]. This is in keeping with the tendency of households to reduce food expenditure as a share of total expenditure as income grows- average per capita per month expenditure on food and beverages for the poorest quintile is estimated to be 60% against the richest which is estimated to spend just 30%. In this case, even though the share has decreased, the level of food expenditure may increase with growth in incomes (due to switchover to better quality and more expensive food). But regional estimates reveal the level of food expenditure is higher in mountains and hills compared to the *Terai*- on an average households in 2005/06, spent NRs.5390 in the *Terai* on food, compared to NRs.6149 in the Hills and NRs.6806 in the Mountains.

[3] It is interesting to note that the share of expenditure on food is higher at around 51% in India (in 2004-05) compared to the share of expenditure on food in total expenditure of households in Nepal. A deeper analysis might reveal the possible reasons that would explain why the share of food expenditure is lower in Nepal compared to India, even though the per capita income level in India is higher.

Food Security Monitoring

In light of the wide regional variations that exist in Nepal with respect to various factors contributing to food and nutritional security, up-to-date monitoring of these factors as well as food security and nutritional outcomes at a regional and sub-regional level is important.

Earlier attempts at monitoring were limited to the Food Balance Sheets prepared by the MoAC at regional/sub-regional levels. These balance sheets give some indication of the net food surplus/deficit at the national, regional and sub-regional levels. However the methodology for estimating these surplus/deficit suffered from various limitations – the major one being lack of data on household food consumption levels (in the absence of which a normative level of food requirement was fixed, and adjusted only for population growth but not accounting for factors such as changes in consumption pattern).

Since 2008, WFP in collaboration with MoAC, the Federation of Nepalese Chambers of Commerce and Industry (FNCCI) and the Consumer Interest Protection Forum has been operating the Nepal Food Security Monitoring and Analysis System or as it is known in Nepali - the Nepal Khadya Suraksha Anugaman Pranali (NeKSAP). NeKSAP collects data from household surveys by field staff and uses the data to publish a host of quarterly bulletins on various aspects related to food security and provides an up-to-date picture of the food security situation at regional/sub-regional level. The monitoring is based on data collected on various indicators covering the availability, access and absorption aspects of food security.

This monitoring system and its outputs are especially useful in responding to potential food security emergencies and for keeping track of the situation in the traditionally vulnerable regions of Nepal – such as the Far and Mid Western Mountain regions. The system currently collects data from a sample of nearly 1200 households spread across more than 50 of the 75 districts, with a greater representation from the vulnerable regions[4].

A closer examination of the methodology and data collected through the monitoring system is required in order to see how this valuable information and insights from the food security bulletins can be used for long term planning and improving program design and implementation.

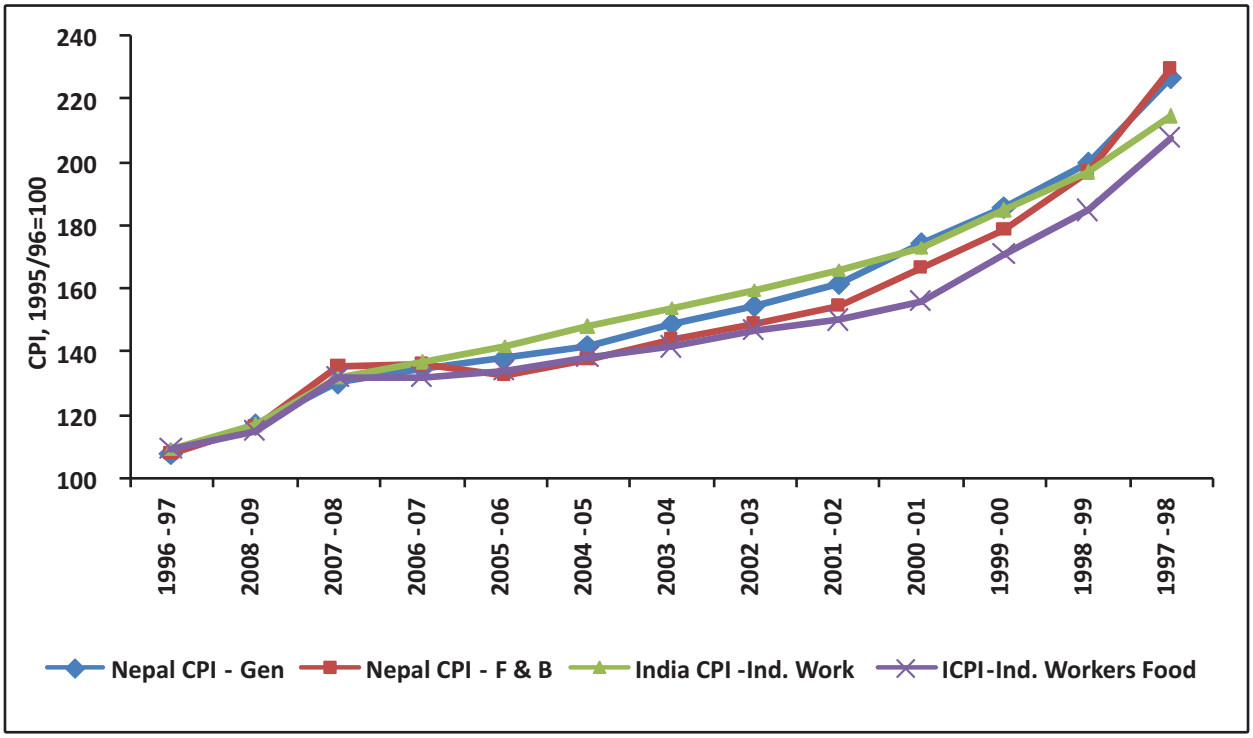
3.3 Prices

A key factor that determines prices in Nepal is the movement of Indian consumer prices (Ginting, 2007). From Figure 3.5, the co-movement of Nepali consumer prices and Indian consumer prices is evident. The Nepal Rastra Bank (2007) notes that; 'Inflation in Nepal is mainly determined by the inflation in India… 1% increase in narrow money supply leads to 0.18% increase in inflation in the same year, while 1% increases in Indian inflation leads to 1.13% increase in Nepalese inflation…'

In more recent years, the prices in Nepal have also felt the impact of the world food and fuel price rise. The annual average consumer inflation in Nepal increased to 13.2% in 2008/09 from 7.7% in 2007/08. This rise in inflation was mainly driven by the significant rise in the

[4] More information on NeKSAP and their quarterly reports are available at http://groups.google.com/group/NeKSAP

Figure 3.5 Movement of consumer price Indices in Nepal and India



Source: NRB (2010) and RBI (2010)

prices of food and beverages items. The annual average food and beverages index rose by 16.7% in 2008/09 compared to an increase of 10.1% in 2007/08. Likewise, the index of non-food and services group increased by 9.5% in 2008/09 compared to a growth of 5.1% in the previous year (NRB, 2009).

With respect to various sub-groups of commodities, on yearly average price level, the price indices of sugar and related products shows a huge increase of 45.9% during 2008-09 compared to a decline of 10.1% during 2007/08. Some other commodities which showed a steep increase in their price indices during 2008-09 include pulses, meat, fish and eggs, restaurant meals, oil and ghee as well as milk and milk products which increased by 25.0%, 23.4%, 18.5%, 16.3% and 15.0% respectively. Region-wise, yearly average price level in Kathmandu Valley, *Terai* and the Hills rose by 14.3%, 12.8% and 12.7% respectively in 2008/09 (compared to the respective rates of 7.2%, 8.1% and 7.4% in the previous year) (ibid).

Another issue impacting food access and consumption in Nepal is the problem of physical connectivity and infrastructural constraints to flow of food and other commodities in the remote districts resulting in substantial price differentials across different parts of the country (Table 15).

Often these districts are remote and unconnected by paved roads, with low cultivable land and subsistence based agriculture on which a relatively small share of population depends. For instance region-wise average travel time taken to reach the nearest paved road in the

Table 3.6 Price differentials in various regions of Nepal for some commodities (2008/09)

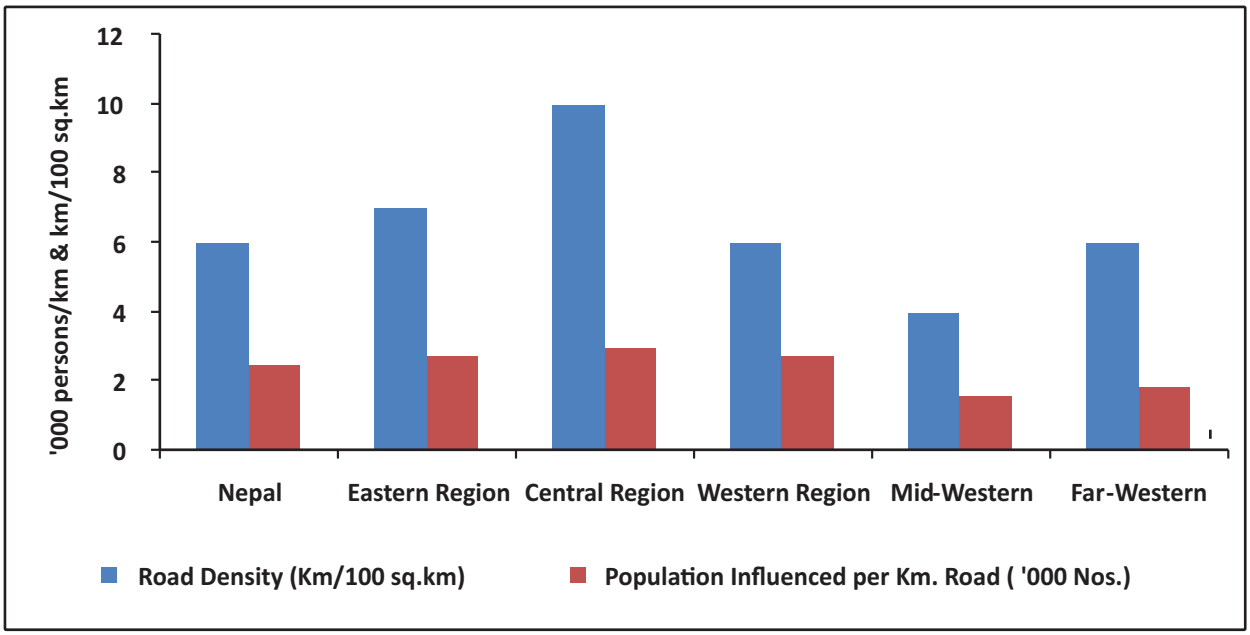
Food Item	Price differentials across regions in relation to national prices (%)			
	Hill		*Terai*	
	Jul/Aug	Feb/Mar	Jul/Aug	Feb/Mar
Rice Coarse	10.6	10.9	-15.3	-14.1
Black Gram	2.1	2.5	-3.0	-6.0
Mustard Oil*	5.8	11.3	-8.1	4.7
Mutton	-2.1	1.0	-25.6	1.9
Potato	8.7	9.2	-13.9	-38.9

Source: MoF, 2009. Note: * Rs. per liter

mid-western and western region are nearly 7 and 3 times that of the central region. Similarly average travel time to nearest market center in mid-western and western region is nearly 3 and 2 times longer than in central regions (CBS, 2005; appendix Figure 3A.1). Figure 3.6 also reveals that the mid and far-western regions have the poorest road connectivity in terms of both population and road length.

The cost of transportation to these districts alone can form a substantial part of the economic cost of food consumption in these regions. Lack of infrastructure is an important factor which can dissuade private traders from supplying food as well as other commodities here. A recent report on the food and agricultural markets in Nepal jointly prepared by WFP and FAO notes that:

Figure 3.6 Road density across regions



Source: DoR, 2008

"In Nepal, however, the market development is most significantly linked to the road network…The most developed markets are found only where roads are developed. For instance, with the improvement of all-weather road access, Sanfebagar—once lacking access to the *Terai* markets has now become a regional market for food." (UNWFP-FAO, 2007).

3.4 Major Strategies and Programs to Improve Economic Access

One of the key constraints to inclusive development and increased access to food is the weak and inadequate social safety net system in Nepal (ADB et al., 2009). Based on an internationally comparable Social Protection Index (SPI)[5] estimated by ADB (ADB, 2006 & 2008) indicates that Nepal is placed in a relatively low SPI ranking – 24th out of 31 countries. Total expenditure on social protection was about 2.3% of GDP in 2002-03, or about US$5.5 in per capita terms. Almost half of total social protection expenditure is found to be spent on social insurance, which tends to be confined to the public and formal sectors and thus exclude the great majority of the population, particularly the poor. About 30% of social protection expenditure was spent on microcredit, while expenditure on social assistance, labor market programs, and child protection accounted for about 20% (ADB 2006). While the coverage rate varies across different programs, the overall rate was only 18% of key target groups, such as the unemployed, the elderly, the poor, and the disabled. However, a plethora of initiatives and development projects centered on poverty reduction, employment generation and infrastructure creation are currently underway under the stewardship of a range of players from bilateral and multilateral agencies, non-governmental agencies to the government itself. In fiscal year 2008/09 alone 451 development projects were underway, where around 112 focused primarily on employment generation and poverty, 154 on physical infrastructure, 67 on targeted social development and 19 on relief, reconstruction and reintegration activities. In this way an estimated 57.3% of the entire development expenditure of the budget in the same year has been directed towards poverty alleviation activities (MoF, 2009). We briefly encapsulate some key strategies and initiatives targeted at poverty reduction/employment generation and subsidizing prices for food consumption, primarily through the Nepal Food Corporation (NFC).

Poverty Reduction and Employment Generation

Poverty reduction has been a high priority in Nepal's planning process right from the seventh plan onwards (1985-90) as well as in influential policy developments like the Agricultural Perspective Plan (1995) and governance reforms like the Local Self Governance Act (1999). The tenth plan (2002-07) accorded special priority to poverty reduction via the Poverty Reduction Strategy Paper (PRSP) where 'broad based and sustainable economic growth, social sector and human development, targeted programs and improved local governance' were envisioned as the four pillars of poverty reduction. The current Three Year Interim Plan (TYIP) document also accords a high place to poverty reduction with the target of reducing poverty head count rate to 24% from 31%.

[5] A summary indicator of the overall level of social protection activities in a country is calculated based on four components, namely (1) social protection expenditures, (2) social protection coverage, (3) social protection/ distribution/poverty targeting, and (4) social protection impact on incomes of the poor

The six key strategies envisioned by this plan document are; 'emphasizing relief, reconstruction and relief activities, followed by employment creation and economic growth for poverty reduction, promoting good governance and effective service delivery, increasing investments in physical infrastructure, emphasizing social development and inclusiveness through targeted programs' (NPC, 2008).The allocation of budget for the target programs increased from NRs.2140 million in 2002-03 to NRs.4,740 million in 2006-07. Although the share of the targeted program in the total budget allocation is gradually increasing (e.g. from 2.6% in 2002-03 to 3.1% in 2006-07), it is still inadequate given the severity of the problems the targeted population is experiencing (IMF, 2007).

One of the largest targeted programs is the Poverty Alleviation Fund (PAF), which has been established under the Poverty Alleviation Fund Ordinance 2003 and is operating as an autonomous institution through the Poverty Alleviation Fund Act 2007. Set up in 2003 with a grant of US$ 15 million from the World Bank (which additionally supports the fund with a round US$100 million annually), PAF was envisioned to be an autonomous and professional organization, chaired by the Prime Minister. The PAF's Social Inclusion strategy includes (1) targeted beneficiaries as poor women, d*alits*, and *janajatis* (2) at least 50% of the CO being women (3) at least 80% of the CO members from targeted beneficiaries and (4) the office bearers (chairperson, secretary, and treasurer) of the COs from *dalits, janajatis*, and women.

Started in 6 districts, activities under PAF were scaled up to more than 55 districts by 2009/10. Under PAF nearly 4000 community based micro-projects are underway to create and sustain social and economic infrastructure, skill enhancement and capacity building and institutional development of CBOs. In FY 2007/08, PAF channeled an estimated NRs.1.5 billion for income generation and community infrastructure projects. Almost 10000 CBOs have been formed, under which more than 9000 projects for raising incomes like animal husbandry and rearing, vegetable farming, fruits processing etc. have been undertaken, benefiting an estimated 342854 households (amongst who 67.7% are extremely poor).

Activities under the banner of poverty alleviation (as well as initiatives like PAF) are wide ranging from efforts at improving access to health and education to physical infrastructure and social mobilization activities to raise inclusiveness amongst marginalized groups. Table 3A.7 (Appendix) summarizes some key programs active in rural Nepal presently addressing employment generation via infrastructure creation especially roads. The majority of programs are funded by multi- or bi-lateral assistance as well as through the government itself. Implementation of these programs are primarily under the purview of the local level government staff (Village Development Council and District Development Councils) as well as non-governmental actors on the field like international/national/local NGOs, Community Based organizations (CBOs) and in some cases even private sector enterprises.

Food Distribution

On the consumption and prices side, food based safety net programs aim to increase economic access via distribution of food at subsidized prices as in the case of Nepal Food Corporation

(NFC) or conversely distribute food as an incentive- as in the case of school feeding programs for the Food-For-Work program coordinated by World Food Program (WFP).

The NFC currently distributes subsidized food in 30 remote hilly and mountain districts in coordination with district-level committees. Since NFC procures from the open market, its operations are subsidized mainly via transport subsidies as food is transported via air. Thus NFC passes on this subsidy to consumers by selling food grains to target beneficiaries (identified by the local governments) at ideally lower than market prices.

Various studies that have analyzed the efficiency of NFCs operations have identified significant gaps and inefficiencies in its functioning. Seddon & Adhikari (2003) observe that until the late 1980s, NFC mainly catered to Kathmandu which consumed 45-50% of the food supplied. From the 1990s, NFC was restructured under the Asian Development Bank's loan contract after which Kathmandu and other accessible areas do not receive subsidized food. But despite its reforms, there are still seem to be many deficiencies in NFCs operations. By 1996 NFC's losses amounted to around NRs.905 million, mainly due to high costs in transport, marketing and operations (APROSC, 1998). Prakuryal et al. (2008) also observe that targeting errors remain - NFC is estimated to have met only 36% of its target quota for the inaccessible regions as against 64% for the accessible regions during the period 1998-02. NFCs operations remain expensive because of the high cost of transport- the cost of transporting rice by air, for example, is typically four times the price of rice in the *Terai*. From the consumer point of view, NFC prices in some regions are estimated to closely correspond to prevailing retail prices of coarse rice in Hill and *Terai* regions (UNWFP-FAO, 2007). Also as seen earlier the actual quantity of food distributed by NFC is a very small share of the total production. Moreover in recent years, food distributions in remote parts of the districts have been severely disrupted by the conflict situation, as food depots were closed. Prakuryal et al. (Ibid.) estimate that despite transport subsidy, NFCs transport and operating costs are still high relative to the private sector. It is necessary to critically evaluate the current operation of NFC and devise ways and explore alternate mechanisms to ensure food reaches the needy in a cost-effective and speedy manner.

Other targeted food distribution efforts underway with the financial and logistical assistance as well as actual food supply from WFP are outlined below;

- Rural Community Infrastructure Works Program (RCIW): Around 480000 poor people benefit from Food-For-Work projects each year, consisting of rural road construction and community-based projects such as irrigation and soil conservation structures, and income generation projects. These efforts cover around 25 districts in Nepal. The food/ cash transfer component is valued at US$ 4.5 million. The wage rates are set based on market analysis at 5 kg rice or Rs 200/ labor for a day (Sah, 2010).
- Food for Education Program (FFE): is directed at improving the nutritional status, school enrolment and attendance by children, particularly girls, by providing a mid-day meal and a take-home ration of oil for girl students. In total 3600 schools across 18 districts are covered.
- Mother and Child Health initiative: This program aims to improve the health and nutritional status of pregnant and nursing mothers and their young children (aged 6 to

36 months) by providing essential nutritional food support in the form of a monthly take-home ration of fortified food. The program now operates in 11 districts with average annual beneficiaries totaling 64000.

While a regionally differentiated strategy is necessary it may be useful to coordinate and streamline all these independent programs in order to efficiently raise incomes of the vulnerable population. The key issue in such programs is to evaluate their cost-effectiveness, leakages and their reach to the real poor. A rigorous and independent assessment of these initiatives will enable policy makers to earmark the most successful models and implement them in keeping with the needs of different communities in different regions for most long lasting results. This will also enable policy makers to identify the most suited roles each the existing current actors can play.

3.5 Concluding Remarks: Economic Access for Food and Nutritional Security

In summary, it has been seen that Nepal has exhibited one of the highest rates of poverty reduction of 3.7% per annum during the period 1995-96 to 2003-04. During this time the agricultural sector in Nepal showed a relatively high growth rate of 3.6%, and also saw a jump in the income from remittances (from 1.2% of the GDP in TE 1995/96 to 11.6% of the GDP by TE 2003/04). Further research is required to identify the crucial factors responsible for the decline in poverty so that policies and investment strategies can be designed to augment those factors that have the highest marginal returns in terms of poverty reduction.

Agriculture is seen to be still the major sector of employment engaging 67% of the total workforce and remains the primary income source, constituting nearly 53% of total household income on average. Poverty incidence also seems to be high among agricultural sector workers and incomes as well as poverty levels vary considerably across development regions and ecological zones. Increased male migration has resulted in more number of women-headed agricultural households – though it is not clear yet what economic and social impacts this high rate of migration has had.

In terms of income safety nets the role of the government seems to be limited, and most welfare programs are driven by aid-agencies and external funding. In terms of food distribution the NFC's role and coverage seems to be limited and there is a need to evaluate the current NFC operations in comparison to other possible alternate mechanisms in terms of efficiency in operations and targeting. There are numerous programs run by aid-agencies covering specific target groups in limited areas. However, these programs do not seem to have a well laid out and integrated approach to addressing the problems of livelihood and food and nutritional security. Independent evaluation of the various developmental programs underway is required in order to identify successful programs and to find suitable pathways for up scaling and enlarging their coverage.

Access to clean drinking water is one of the essential factors in ensuring nutritional absorption

4 Absorption Factors and Nutritional Outcomes

- Nepal has shown significant improvement in Infant and Child Mortality rates (reduction of 25% and 33% respectively from 2000-08), while anthropometric nutritional indicators have not shown similar improvement.
- Good performance has been witnessed in indicators of absorption factors – literacy rates, especially of women has increased (a 60% rise during 1995/96 – 2003/04); indicators of healthcare and nutritional interventions also show a marked improvement.
- Food safety policies and enforcement in Nepal lags behind other countries, and needs to be reviewed.
- Public social sector expenditure has been increasing but the level still remains low (for instance health sector expenditure was less than 1% of the GDP in 2008-09).
- There is a need for rigorous evaluation of nutrition and health interventions underway in the country to identify successes and to formulate long-term investment plans.

4.1 Health and Nutrition Outcomes

As described in the framework, the outcomes of food and nutritional security are also mediated by non-food factors which are essential for ensuring proper utilization of the food available and accessible. These factors are commonly called absorption or utilization factors consist of utilization of health and nutritional services/infrastructure, water and sanitation quality/infrastructure, education services/infrastructure as well as safe food practices. This section first describes the current status of health and nutritional outcomes across Nepal before examining the current status and challenges facing the provision of adequate food utilization or absorption factors.

Infant Mortality Rate (IMR) and Under 5 Child Mortality Rate (CMR) are important indicators of the health status in a country. On both these indicators Nepal has shown a great deal of improvement. Figure 4.1(a) & (b) shows that Nepal's IMR and CMR (41 and 51 per 1000

live births respectively in 2008) are better than the South Asian average (58 and 76 per 1000 live births respectively in 2008) and Sri Lanka is the only South Asian country performing better on these two indicators. This is certainly a positive achievement and it would be important to identify through further research the factors that have helped Nepal reduce infant and child mortality so that important lessons from here can be applied for developing strategies for health interventions in the future. Also child mortality rates in Nepal vary significantly across regions, with rural areas, mountainous/hill regions and western regions worse off (refer Annex Figure 4A.1 for details), and effective health interventions to target these regions need to be based on sound research evidence.

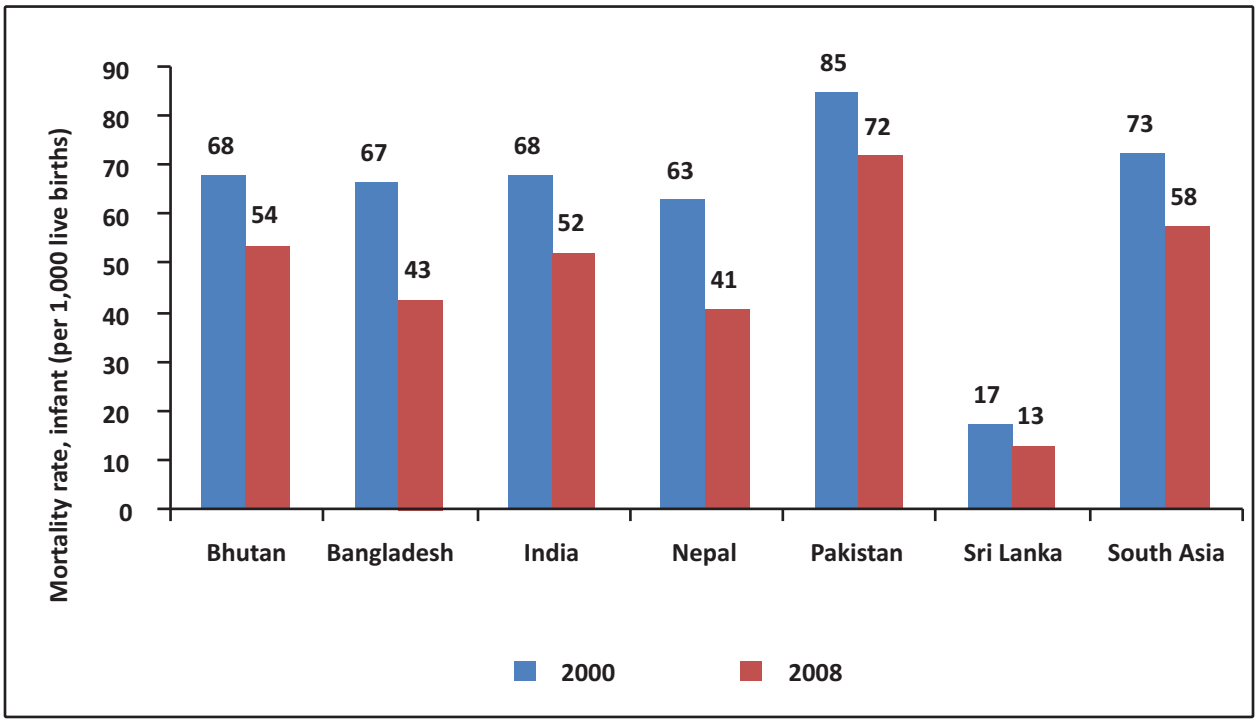
In terms of adult mortality Nepal's performance is relatively less positive than the case of child and infant mortality, especially with respect to adult female mortality. Male adult mortality in Nepal is 199 per 1000 male adults which is still better than the South Asia average of 246 per 1000 male adults. The level of female adult mortality in Nepal is more or less at the South Asian average (Figure 4.2 a & b).

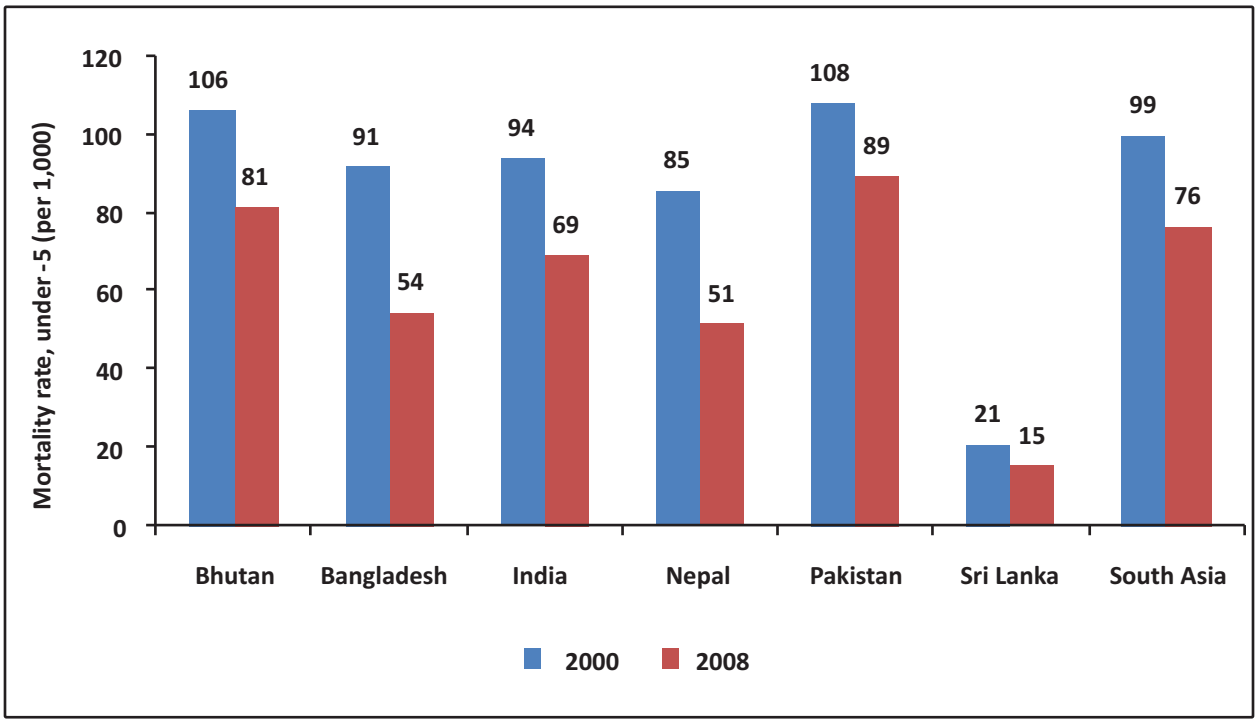
Anthropometric indicators are used to indicate nutritional outcomes in a population. As noted earlier there is some variance between the levels of undernourishment (measured by the Food Balance Sheets and FAO) and anthropometric outcome indicators in Nepal i.e. even though it has the lowest malnourishment level across south Asian countries, it fares poorly on women and child nutritional indicators. Available anthropometric estimates for Nepal relate to children - namely underweight, stunting and wasting indicate Protein Energy Malnutrition (PEM) and adult women - namely Chronic Energy Deficiency (CED) measured using Body Mass Index (BMI). While these indicators are commonly used measures, they capture the nutritional status of only about 40% of the population[1] (i.e. children under age 5 and women in the age group 15-49). A suitable index of these parameters and other nutritional indicators needs to be used in order to arrive at an overall picture of the level of nutrition across regions.

In terms of child under nutrition indicators, the percentage of children stunted and underweight (under five) from 2001 to 2006 have decreased, albeit marginally by 13.5% and 10.2% respectively (Figure 4.3). In terms of wasting of however there has been a slight increase in 2006 over 2001. The levels of stunting and underweight in Nepal are much higher than the world levels of 34.6% and 22.4% respectively. They are also much higher than the South Asia average levels of 46.7% and 41.1% for prevalence of stunting and underweight. Child nutritional indicators too show a high degree of variation across regions in Nepal. Among ecological regions, the mountain region has the highest prevalence of stunting (62%), followed by the hill region and the *Terai* having the least. In terms of underweight and wasting, however, the *Terai* region has the highest incidence (refer Annex Figure 4A.2 for more details). At the national level, change in these measures are apparently very low- if this reduction rate is maintained, it will take up to 2053 before the Millennium Development Goal (MDG) of a 50% reduction will be reached – 38 years after the set target year of 2015 (Sah, 2010).

[1] Based on population projections for Nepal for the year 2006 (CBS, 2003)

Figure 4.1 (a) Trends in infant mortality rate (IMR) and (b) Under 5 child mortality rate across South Asian countries (2000-2008)

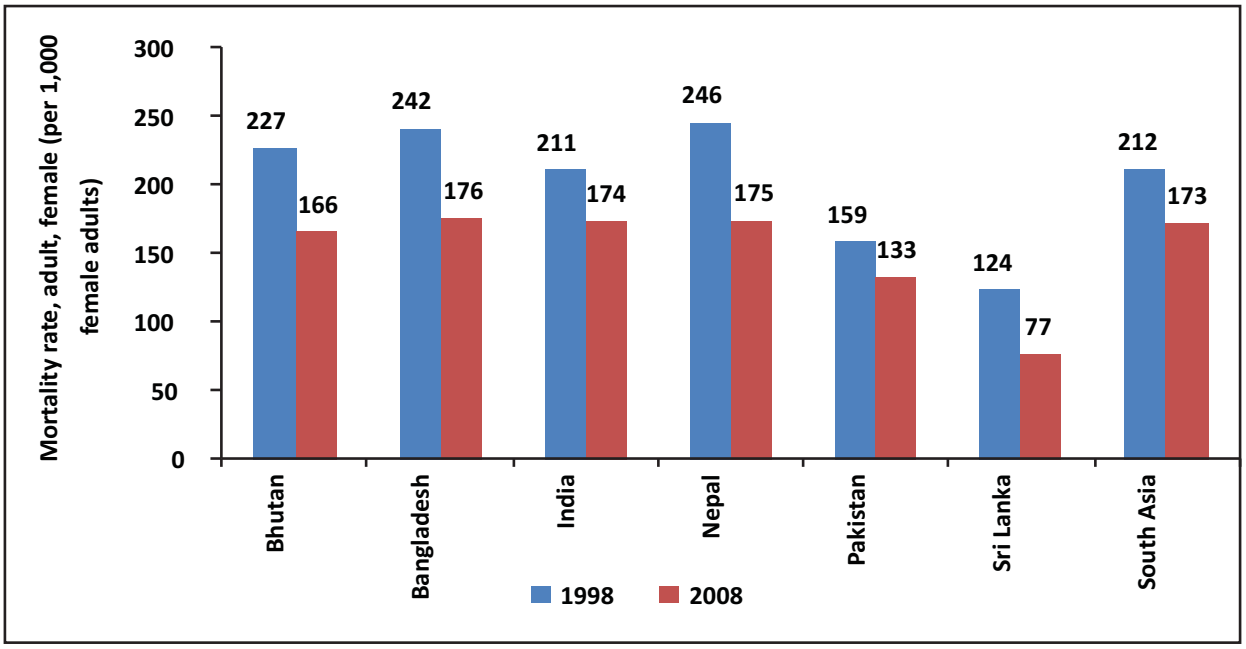


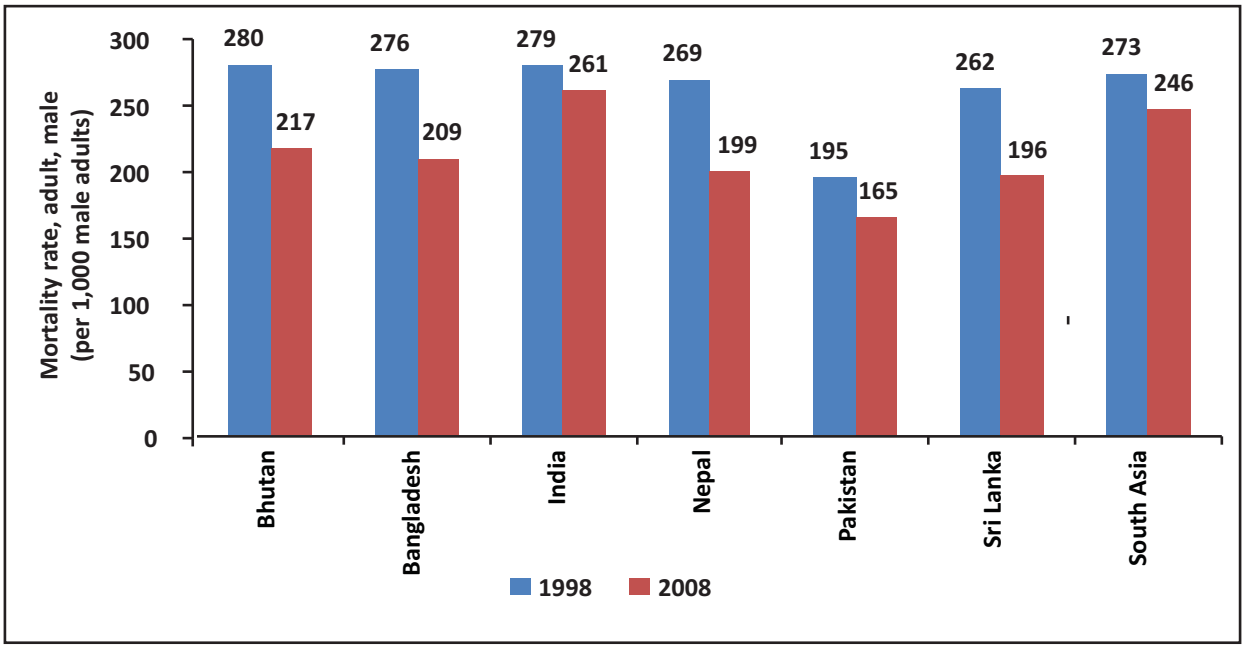


Source: WB, 2010

With respect to the nutritional status of adult women in Nepal, the percentage of adult women who are classified as thin (BMI less than 18.5) has shown a slight decline in 2006 over 2001, decreasing from 27% to 24%. Overall the percentage of thin women in Nepal is lower than

Figure 4.2 (a) Female adult mortality and (b) Male adult mortality across South Asian countries (1998 – 2008)



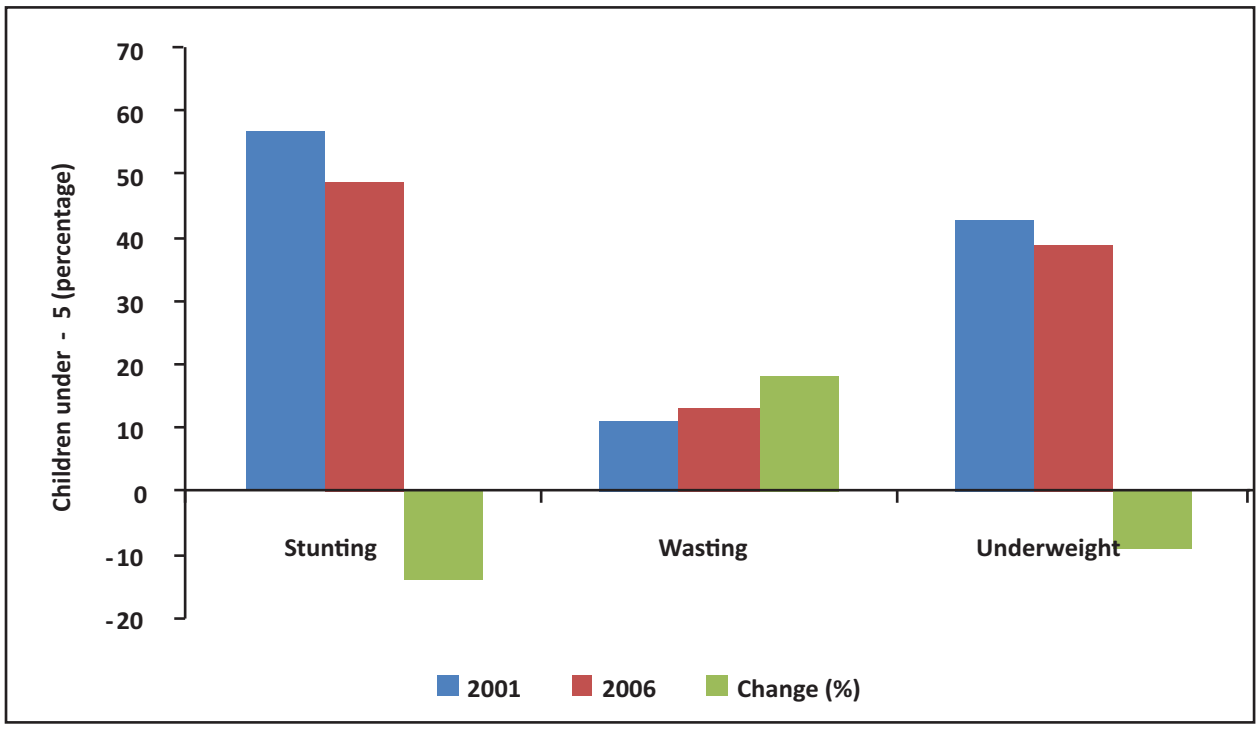


Source: WB, 2010

in India (35.6%) and Bangladesh (34%)[2]. Again within Nepal there are wide inter-regional variations with the *Terai* showing highest incidence with 33% of the adult women population being classified as thin (further details are included in Annex Figure 4A.3).

[2] India and Bangladesh figures from FAOSTAT (2008).For Bangladesh the share of thin women is for the age group 10-49, and may not be strictly comparable with the figures for Nepal and India.

Figure 4.3 Trends in under-5 under nutrition in Nepal



Source: NDHS 2006

The anthropometric outcomes of nutrition depend upon not only food consumption and calorie intake, but also the quality of nutrition and micronutrient intake. Poor nutrient intake is reflected in poor health outcomes. Some common indicators associated with poor nutrition include Iodine Deficiency Disorders (IDD) like goiter[3], night blindness risk due to vitamin A deficiency[4] and anemia due to iron deficiency (some information on the status of a few of these indicators in Nepal is presented in the Annex Figures 4A.4 and 4A.5).

4.2 Status of Absorption Related factors – Education, Health & Sanitation

As mentioned earlier the health and nutritional outcomes are mediated by a host of factors. Nepal's performance with respect to these absorption related factors has been mixed – with the country showing improvements in some aspects while other areas are still lagging.

[3] Although goiter is the most commonly known consequence of iodine deficiency, lack of iodine causes a variety of other complications, such as stillbirth, cretinism and mental retardation. Iodine deficiency is in fact the main cause of impaired mental functioning whether induced in *utero* or postnatally. IDD is caused by too low iodine content in the soil, and thus in the plants and animals deriving their nutrients from that environment.

[4] Vitamin A deficiency is caused by too low intake of vitamin A, which in turn is caused by low intake of food with good vitamin A content. Although many fruits and vegetables have a relatively high content of vitamin A, absorption is often poor. The best sources of vitamin A are liver, eggs and meat, foods that are too expensive for frequent consumptions for most Nepalese. Vitamin A capsules distributed through FCHVs has covered nearly 100% of the target group (<5) since 2005/06 to 2007/08 (Sah, 2010).

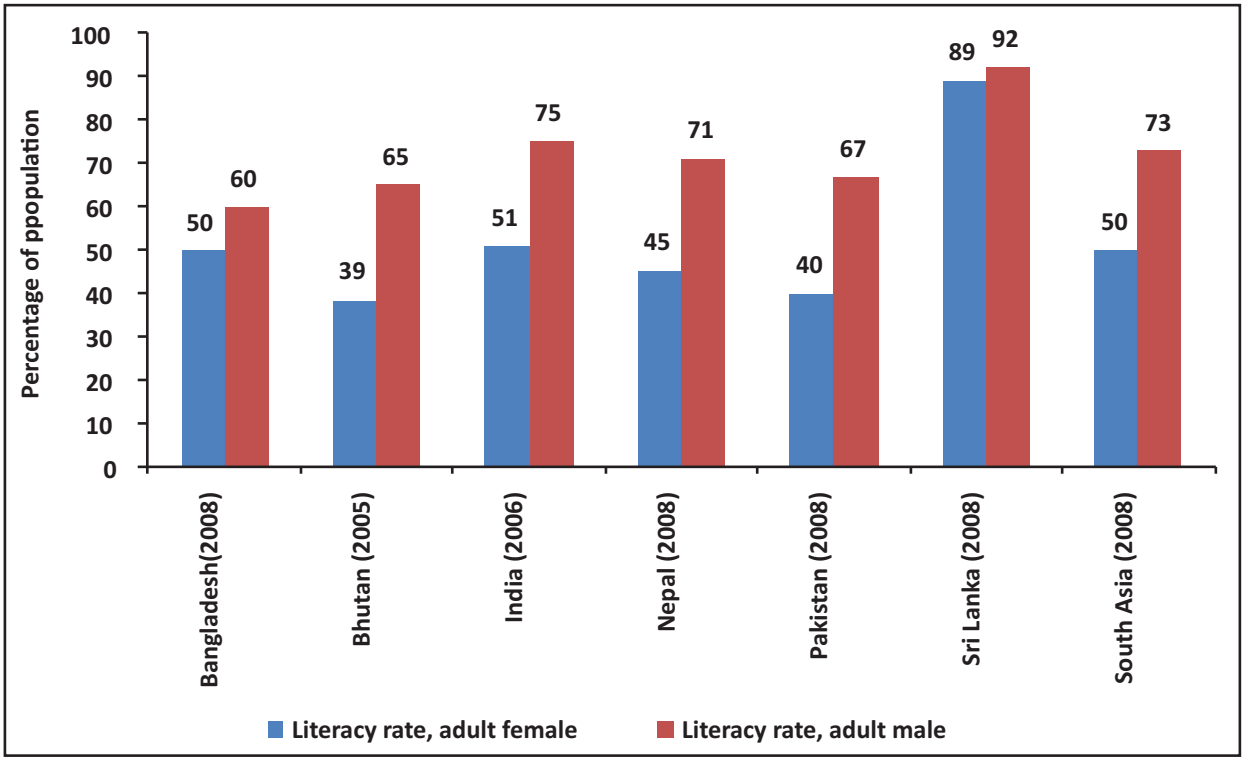
One of the aspects in which Nepal has shown improvements has been with respect to education, an important absorption factor. Nepal has made considerable improvements in literacy rates from the nineties according to estimates from the NLSS. At the national level, male literacy has increased by over 20% during 1995/96-2003/04 and female literacy has also increased by 59.8% during this time. Despite this, female literacy rates especially are still low at only 34.3% in rural areas (Table 4.1). Overall the female as well as the male adult literacy rates (of 45% and 71% of the female and male population above 15 years respectively in 2008) was lower than the South Asia average (Figure 4.4). Region-wise estimates reveal that there are still some regional variations in the literacy rates within Nepal with the literacy levels being low in the rural areas, mountain regions, the mid-and far-western regions and the central regions (see Annex Table 4A.1 for details).

Table 4.1 Trends in literacy rates in Nepal (%)

	Male			Female		
	1995/96	2003/04	% Change	1995/96	2003/04	% Change
Nepal	52.15	63.5	21.8	24.35	38.9	59.8
Urban	77.31	84.5	9.3	50.07	64.2	28.2
Rural	50.07	59.3	18.4	22.43	34.3	52.9

Source: CBS, 2005

Figure 4.4 Adult literacy rates (male and female) across South Asian countries

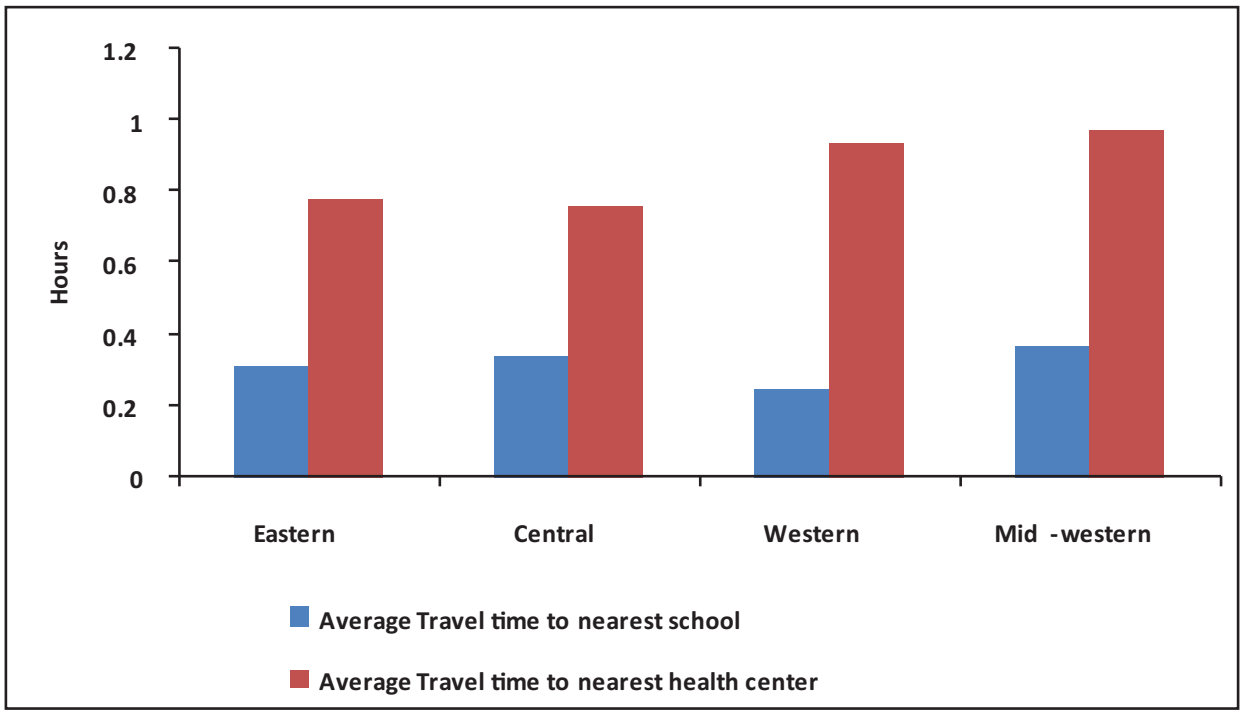


Source: WB, 2010

Another absorption factor which has seen some improvement in the past two decades has been Nepal's health infrastructure. The number of healthcare institutions has increased from around 1,800 in 1992/93 to nearly 4,400 institutions in 2007/08. This growth has been driven primarily by an increase in the number of local sub-health posts and primary health centers which expanded rapidly from 700 and 20 centers to 3,100 and 200 centers respectively from 1992/93 to 2007/08. These local sub-posts and primary centers are mostly staffed by village level health workers as well as other maternal and child health workers, who travel once a month or more to a pre-arranged post. The skilled man power available during this period has also almost tripled to around 9,100 persons due to an increase in the number of nurses (whose number almost quadrupled during this period).

Despite better levels of availability, access to healthcare remains problematic especially in more remote regions- the especially in western and mid-western regions (Figure 4.5). There is also severe shortage of trained personnel especially doctors, who numbered 5 to every 10000 persons (even nurses numbered only 26 to 10000 persons). On an average household spending on healthcare is around 4.5% of total expenditure- richer households spend slightly more at 5% against poorest households who tend to spend around 3% of their income (CBS, 2005). Utilization of medical guidance and healthcare is determined by a number of factors, including educational background and awareness, culture, road infrastructure, household incomes and prices of healthcare services (annexure Table 4A.2 and Figures 4A.6 and 4A.7 present further information on the geographical spread and regional variation in utilization of medical services in Nepal).

Figure 4.5 Average travel time to nearest facility (2003/04)



Source: CBS, 2005

Apart from health institutions/infrastructure access to safe and potable drinking water is essential in order to reduce risk of infections and disease. For this water supply and sanitation facilities are the key to maintaining health and basic standard of living. An estimated 66% of households do not have any toilet facility. Around 44% of rural households use a public tap as the main source of water as unprotected wells or streams are the main source of water for 11% of the households (NDHS, 2006). Although some improvements have occurred, these levels still are too low. Rural areas moreover fare poorer than urban areas- for instance around 80% of households have access to improved sources of drinking water against almost 90% in urban areas, and only around 40% households have water in the premises against 72% of urban households (NDHS, ibid).

Another important factor determining proper food absorption and utilization is food hygiene and food safety. Domestic food hygiene and safe handling needs to be tackled through awareness and education of the community, especially women, regarding safe practices. At a different level laws and regulation play an important role in ensuring food safety for processed foods and other items of food consumption. Nepal seems to be lagging behind in this regard. Currently the Food Regulation Act 1970 (last amended in 1998) governs food safety aspects in Nepal and requires to be updated to meet current needs. Along with updating of the Act, effective enforcement is also an issue (Nutritional Assessment Team, 2009). The sole responsibility for enforcing the Act lies with the Department of Food Technology and Quality Control (DFTQC) of the MoAC. With increasing risk of zoonotic diseases, and as processed food consumption becomes more widespread with changes in food patterns among the population, food safety is an issue that will become more and more important. Consequently it is crucial that the policy and regulatory framework is in adequate shape to meet the challenges posed by these changes.

4.3 Absorption Related Policies and Programs: Status and Challenges

The Interim Constitution of Nepal (2007) recognizes health as a basic right of the people and the provisioning of adequate healthcare as the responsibility of the government. A number of initiatives are underway to increase health care institutions and services and the coverage of various programs. Under the 'Build New Nepal' program, in FY 2007/08 state Health Posts and sub Health Posts provided free treatments to 88,272 persons apart from extension of essential vaccination services and treatment of specific diseases (MoF, 2009). Some key health interventions which have increased absorptive and utilization capacity in relation to food and nutritional security have been treatment of infections and diarrhoea, de-worming initiatives and programs related to the spread of infectious diseases like tuberculosis, malaria, polio, HIV/AIDS etc (refer to Annex Table 4A.3 for a brief list of programs and interventions related to health and nutrition). A key development that fuelled the expansion of these local level service centres was the move to decentralize health services through the Local Self Governance Act whereby health facilities management was to be fully transferred to village development committees (VDCs) and hospital management committees in a phased manner by 2007. Increased emphasis has been placed on the role of community managed health centres and village/district level workers and volunteers especially women.

Nepal has witnessed some improvements in nutritional and health outcomes and shows some improvement in indicators of health and nutritional interventions (Table 4.2 and further details in Annexure Table 4A.4). There seems to have been a marked improvement in women receiving antenatal care in rural areas (which has shown an increase of 54% in rural areas in the period 2001-2006) and in the vaccination coverage of children (which has gone above 80% even in the rural areas by 2006).

Table 4.2 Improvements in indicators of key health and nutritional interventions

	% Children (6-59 months) receiving Vitamin A supplements			% Women giving live birth by Antenatal Care Worker			% Children age (12-23 months) receiving all basic vaccines		
	2001	2006	% Change	2001	2006	% Change	2001	2006	% Change
Nepal	81	87.5	8.0	49.1	73.8	50.3	65.6	82.8	26.2
Urban	75.3	81	7.0	82.4	87.9	6.7	74.9	86.3	15.2
Rural	81.4	88.5	8.7	46.6	71.7	53.9	65	82.4	26.8

Source: NDHS 2006 and NDHS 2001

Similarly on the education front too as seen previously Nepal has shown much improvement. The government education spending had increased from 9% in the early 1980s to around 15% of the national budget and as a proportion of GDP, Nepal's public expenditures on education compare favorably with those in other countries in the region (World Bank 2007). In recent years the expenditure on education as percentage of GDP has gone close to 3.5% making education the highest priority among all social sectors spending (Figure 4.6). The increased spending has translated into improved infrastructure and access to education especially at the primary level. The percentage of households having access to school within 10 min grew from 42% to 51% between 1995/96 and 2003/04 (CBS, 2006). The government in association with various other agencies undertook a number of programs such as Education for All, Secondary Education Support Program, Community School Support Program and Teacher Education Project. Currently the Government of Nepal has in the process of implementing the School Sector Reform Plan 2009-15, which builds upon the on-going government programs. But more importantly the SSR plan also professes to be a long-term strategic plan aimed at achieving specific goals and objectives of basic and secondary education by 2013/14. The SSR plan is to be carried out in a phased manner with time bound targets starting with the integration and consolidation of basic education (grades 1-8) from 2009/10, model building for secondary education (grades 9-12) starting from 2009/10 and continuing through 2012/13 and beyond and restructuring of secondary education, including integration of 9-12 grades will take place across the country from the academic year 2012 and completed by 2015 (MoE, 2009).

A similar long term perspective policy for nutritional security in Nepal does not seem to be in place.. Although various policy initiatives to address the nutrition problem have arisen in the past (like the National Planning Commission's National Nutrition Coordinating Committee, policy documents like Nepal National Plan for Action on Nutrition, 2007, 1998 etc.) nutritional initiatives are still dispersed and yet to be coordinated efficiently by a

single point department/ministry. Nutritional concerns have so far primarily been handled via the Ministry of Health and Population (through the Department of Health) as well as the Department of Education (via school meals schemes, food for education etc.) in coordination with partner organizations at the international (WHO, UNICEF, WFP) and local level (various CBOs and national collaborators). On the field District Development Committees (through local functionaries like the District Nutrition Officer), VDCs and health workers are key to implementing these programs.

A recent effort in this direction, which attempts to formulate a long term policy for addressing nutritional issues, is the Nepal Nutrition Assessment and Gap Analysis (Nutritional Assessment Team, 2009). This study was undertaken 'to provide the synthesis of information necessary to develop a detailed multi-sector Nutrition Action Plan for the next five years'. The NAGA report notes that while Nepal has performed 'extremely well in scaling up and to date sustaining micronutrient interventions', it has lagged behind with respect to 'multi-sectoral interventions addressing food availability and household economics'. The report further notes that the multi-sector interventions 'have not yet been effectively focused on reducing undernutrition', and that 'the current capacity to deliver health-related nutrition programs at national, district, and community levels was inadequate'. The NAGA report has provided a detailed roadmap of possible interventions, their implementation mechanism as well as systems for monitoring and evaluation of these interventions. The report also outlines a set of priority investments. Most of these suggested interventions are based on their proven effectiveness in specific country contexts elsewhere. Only a preliminary estimated cost for some of these investments has been provided based on global cost estimates. Further work and

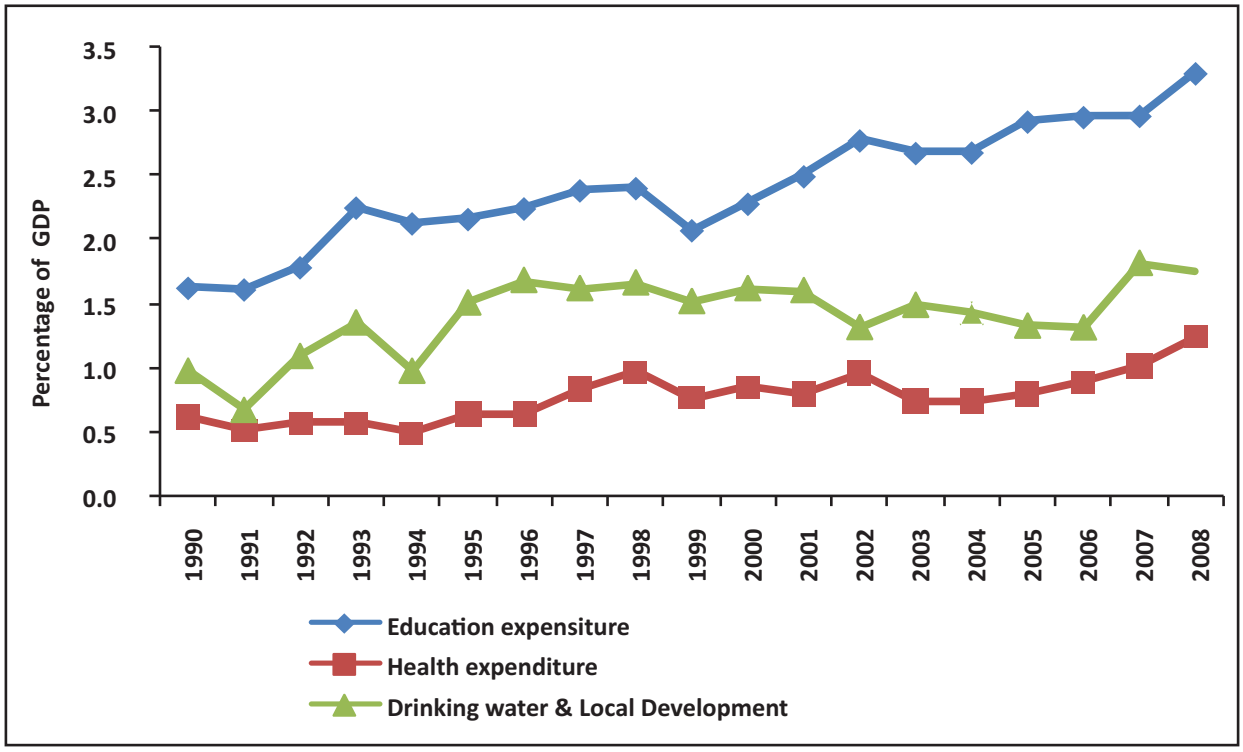
A mother consulting a traditional village healer

detailed analysis of the effectiveness and associated costs of these recommended investments needs to be carried out, keeping in mind the context in Nepal. This is especially required for some of the multi-sector investments that the NAGA report suggests in order to develop them into full fledged investment proposals based on research evidence.

4.4 Concluding Remarks: Improving Absorption and Utilization

As nutritional problems are cross-cutting, an effective national nutritional strategy has to be arrived at which identifies the role and responsibilities of various players clearly. A more coordinated and strong policy response is needed from the government and other players. Public investments in health care are critical and Nepal has been lagging behind in this regard. Health expenditure as a percentage to GDP is still abysmally low hovering around 1% of GDP from the nineties onwards (Figure 4.6). Higher spending is necessary to raise and maintain the number of health institutions across regions as well as the number of skilled professionals working in them; the private sector's role which is already significant can become important in this regard. Apart from this, quality of healthcare services and availability of affordable medicines is a must to pump up absorption and utilization in the long run. In conclusion, the implementation of existing programs and interventions needs to be independently and rigorously evaluated so that public investment strategies for the future can be designed and targeted to achieve decisive impacts on health and nutritional outcomes in Nepal.

Figure 4.6 Public expenditure on education, health and drinking water as percentage of GDP



Source: ADB, 2009

Out-migration of the male workers is resulting in feminization of Nepalese agriculture

5 Gender and Governance Issues

The framework adopted for this study points out two crucial cross-cutting factors – Gender and Governance. These two issues impinge across all the three pillars of Food Security. This section briefly highlights the concerns on these two fronts in the context of Nepal, which are to be borne in mind by policy makers.

5.1 Gender

Various aspects of Nepal's changing social and economic scenario require that gender concerns be at the forefront of discussions surrounding food and nutritional security. These aspects include - migration and related feminization of agriculture and labor, reform of supporting institutions such as credit and extension to adapt to specific needs and requirements of women headed farm households, female literacy and its importance for nutritional and food security etc.

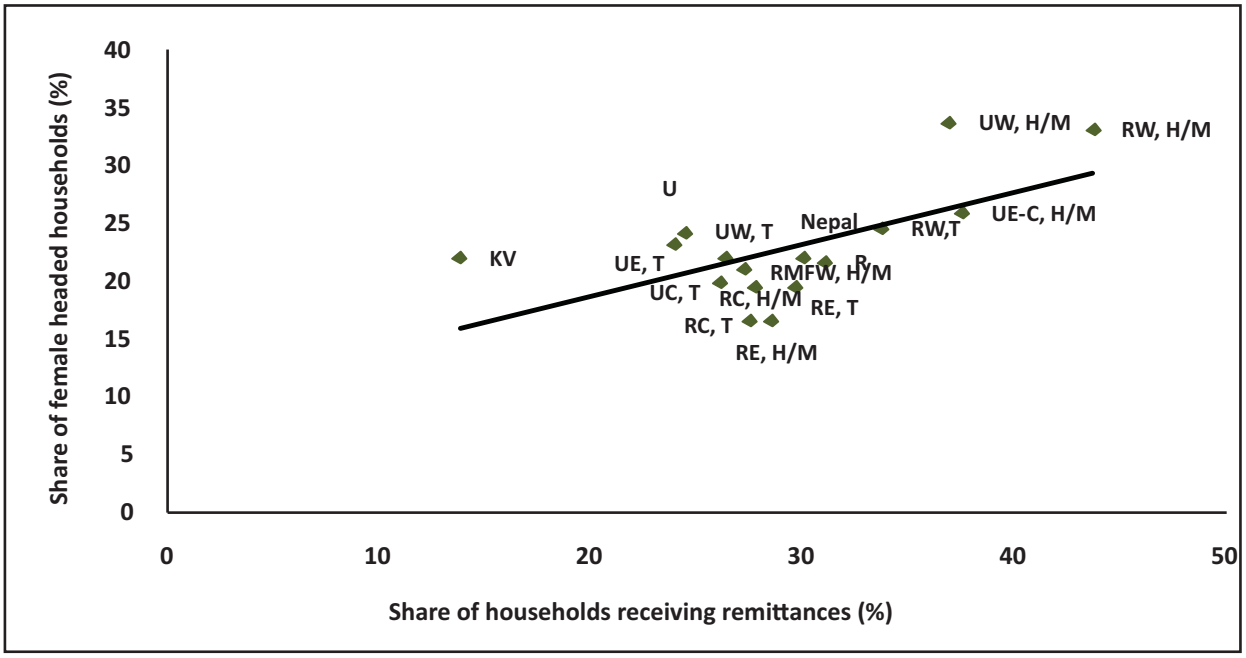
Migrant male workers far exceed female workers[1] - 72% of remittance senders are the sons or husbands of household members and almost all migrants abroad (97%) are men aged 15-44 years old (WB et al., 2006)[2]. This outmigration of the male workforce thus leaves behind a significant share of the female workforce, which has implications for structure of Nepal's local labor market, economy and society as well. Labor Force Survey (2008) estimates reveal that the share of women headed households increased from 14% in 1998/99 to 22% in 2008. It also seen that a reasonably high correlation exists (correlation coefficient at 0.6) between the share of women headed households and share of households receiving remittances (Figure 5.1), indicating a strong linkage between remittances, out-migration and the increasing prominence of women in Nepal's labor market, economy and society.

Given this, it is pertinent to enquire if more women have entered the labor market and if so in which sectors. In an effort to examine this Lokshin & Glinskaya (2009) examine whether women's work force participation (defined by wage-earnings) has increased after the out-migration of a

[1] Figures on lifetime migration 9 from the Labor Force Survey II survey show that share of women migrants are much higher than male migrants- rate of lifetime migration (all ages) was higher for females (44 % overall, with 88 % of female migrants from within Nepal and 12 % from outside Nepal) compared with males (21 % overall, with 85 % of male migrants from within Nepal and 15 % from outside Nepal). This is largely due to migration for marriage i.e. nearly 48% of all lifetime migrants.

[2] The Nepal Foreign Employment Act of 1985 placed some restrictions on foreign work migration by women. It limited the overseas travel of single women and women less than 35 years of age. The Act prohibits the foreign employment of women without special permission from the Government (Sanghera and Kapur, 2000; quoted in Loshkin and Glinskaya, 2008).

Figure 5.1 Share of households receiving remittances and households headed by women, major regions, 2008



Source: CBS (2008) and authors' calculations. Note: Prefixes: Urban (U) & Rural (R), Regions: E-C H-M: Eastern/Central Hill/Mt.; W H-M:West Hill/Mt.; WT: West *Terai*; CT: Central *Terai*; ET: Eastern *Terai*; KV: Kathmandu Valley E H-M: Eastern Hill/Mountain; C H-M: Central Hill/Mountain; W H-M: Western Hill/Mountain; MFW H-M: Mid- Far West Hill/Mountain

male member. Their findings indicate that women who receive remittances shift to work at home (including agricultural self-employment, except for women with higher education).

Increased household incomes from these remittances may be one of the reasons why poverty rates are relatively lower and women shift out of the labor market. Conversely, given the large share of households holding land, it is conceivable that in some cases the women either work on the farm or in the case of larger holdings manage farm workers (Ibid.). This hypothesis is further supported by the influx of women workers into self-employed agriculture employment observed earlier in Section 3 of this report. While further research is required to understand these dynamics, it is clear that women are an increasingly important focus group not only in ensuring household access to food but also in making food available through agricultural production. For this, the smooth entry of women into work markets (in agricultural-sector or outside) has to be ensured along with adequate incentives and fair remuneration.

Also as role of women at the farm level changes from an operational to a managerial one in female headed households there could be specific requirements that are to be fulfilled by the marketing, extension, credit and other institutions. These could be in terms of farm level technology that needs to be adapted for use by women, changes in land/property institutions to allow for female ownership of land and facilitate access to credit from formal financial institutions when the land is in the name of the migrant male.

It is also important to recognize the role of women in ensuring food and nutritional security at the household level. Earlier studies across countries have found a high positive link between reducing child malnutrition and female literacy. For instance Smith & Haddad (2000), in a cross country analysis over the period 1970-1995 report that women's education was a major contributing factor to reducing child malnutirition, contributing nearly 43% to the reduction in malnutrition. A preliminary analysis of this linkage in the Nepal context has also been carried out in this report and discussed in the next section.

5.2 Governance

Governance issues are important at two levels. Firstly, of concern, is the overall governance climate in Nepal, which is experiencing a transition as the nation moves towards a fully fledged constitutional republic. A stable political and governance framework is important for maintaining a climate which is conducive for private investment. At the second level it is also crucial to examine issues of governance related to policy formulation and program implementation – the operational issues of good governance.

At a national level, as Nepal passes through an important political transition, it is crucial for the government to maintain high standards of transparency and vigilance. Transparency International's Global Corruption Report 2009 places Nepal 143rd out of 180 countries on Corruption Perceptions Index, slipping down from a ranking of 137 in the previous year – which puts Nepal at the lower end of the rankings among South Asian countries. The Transparency International report (TI, 2009) also notes that despite several legal and institutional changes such as The Right to Information Act 2007, The Anti-Money Laundering Act 2008, The Good Governance Act 2008 etc., 'there have been many instances of indecision and setbacks. Initiatives not implemented or followed up, [including] provisions in the interim constitution'. Dealing with these issues is paramount for ensuring investments, as well as for making sure that development efforts reach the targeted population.

Governance issues related to policy formulation, program implementation, monitoring and evaluation are also crucial. Various agriculture and developmental policies and programs in the past have failed to show expected results in Nepal (for instance, the Agricultural Perspective Plan (APP), the Basic Needs Program etc.). On the other hand Nepal has also witnessed many successes such as the Community Forestry program, Vitamin A supplementation intervention and others. It is important to identify how far current policies and programs incorporate the lessons learnt from the past successes and failures. With respect to agriculture there seems to be some movement in this direction. The National Agricultural Policy 2004 and the Agribusiness Promotion Policy 2006 retain the core emphasis of the APP on diversification and commercialization of agriculture as a means to boosting growth. However, these policy documents show that the government recognizes that the expected results would be difficult to achieve if the past trends of persistent underinvestment and lack of human resource capacity continue and these policies indicate a greater thrust towards recognizing the role of partnerships with the private sector, cooperatives and other civil society agencies.

Enabling policy formulation needs to be followed up with effective implementation, which requires that there be some measure of stability and effective governance across different administrative units and sectors.

Mothers' health and education are important determinants of children's nutrition status

6 Agriculture, Poverty and Nutritional Outcomes: Linkages and Synergies

6.1 Identifying the Linkages

Nutritional outcomes are determined by numerous biological factors (like birth weight, age of mother at conception etc.) and socio-economic factors (incomes, safety nets, access to healthcare and education etc.). In this section we attempt to explore some of the factors of the socio-economic category that influence nutritional outcomes in Nepal.

At the outset economic wellbeing and household incomes seem to influence nutritional outcomes. In the lowest wealth quintile category 61.6% and 47% of the children below the age of 5 were stunted and underweight respectively. Similarly among women 72.5% of the women in the lowest quintile were thin compared to 64.3% in the highest quintile (Table 6.1).

Given the majority of households are engaged in agriculture, boosting incomes from agriculture can play a large role in reducing under-nutrition. As mentioned previously, the majority of labor force work in agriculture in spite of the share of agriculture to GDP declining to around 34% (2008/09). But poverty estimates also show a higher concentration within the agricultural sector. Even though overall poverty head count ratio has shown a reduction, the concentration of poor within the agricultural-sector has increased from 76.4% in 1995/96 to 77.8% in 2003/04. Also poverty head count rates as well as concentration of poor population among small and marginal land holders was the highest with the lowest rate of reduction from 1995/96 to 2003/04 (refer Annex A.3, Table 3A.2).

Table 6.1 Nutritional outcome indicators among children and women across consumption quintiles (2003/04)

Wealth Quintile	Children under-5 (%)			Women age 15-49 (%)	
	Stunting (-2SD)	Wasting	Under weight	Height (<145cm)	BMI(ht/wt) (<18.5)
Lowest	61.6	11.5	47.0	17.6	72.5
Second	54.9	15.2	46.0	15.8	63.5
Middle	50.4	15.2	41.7	14.2	67.0
Fourth	39.8	12.8	31.0	12.0	68.4
Highest	30.9	7.0	18.8	11.4	64.3
Nepal	49.3	12.0	38.6	14.1	67.0

Source: NDHS 2006

The linkage between agriculture and poverty in Nepal is further strengthened by the fact that a large percentage of household income consists of farm income (48% of household income overall and higher for households in mountain regions at 59%). For the poorest and the second poorest consumption quintiles the dependence on farm income goes up to 62% and 58% respectively. With the weak performance of the agricultural sector, the disparities in wealth and consumption seem to be growing. In nominal terms, per capita consumption increased from NRs. 6,802 in 1995/96 to NRs. 15,848 in 2003/04. Growth in per capita consumption was 91% for the bottom quintile of the population and 177% for the top quintile. In 2003/04, the bottom twenty percent of the population accounts for 6% of total consumption while the richest twenty percent of the population consume 53% (Sah, 2010).

These economic inequalities reflect in differences in the food intake and food consumption patterns, in variable access to health, education and other factors and finally in the nutritional outcomes across various socio-economic categories. The food intake by children and women by wealth quintile reveals that while cereal/grain intake decreases with rise in income, the consumption of nutritious foods like milk and meat/fish decreases with declining income level in women. 45.7% and 44.6% of women in the highest wealth quintile consumed milk and meat/fish while among the lowest quintile the corresponding percentages were 24.2 and 23.2 respectively. Likewise, the use of Vitamin A rich food and all IYCF practices in children shows an increase with increasing income level (Table 6.2) (Sah, ibid). It can also be noted that given that majority of households are engaged in subsistence agricultural production, homestead production is instrumental in the diets and food supply of many Nepali homes and directly feed into their nutrient intake.

Incomes also directly impact household access to many absorption factors like healthcare and education. In terms of access to health facilities there is a significant difference between wealth categories. The percentage of children among the highest wealth category receiving basic vaccinations and treatment at a health facility is much greater than lower wealth quintiles. In terms of antenatal care, the differences are even starker. Close to 60% of the mothers in the highest wealth category had received antenatal care from a doctor while it was less than 10% for the lowest quintile (Figure 6.1). Income also is an important determinant of education

Table 6.2 Food consumption and food supplements among women and children across consumption quintiles

Wealth Quintile	Women consuming (%)			Children (%)	
	Milk	Meat/Fish	Grain/Cereals	Vit A rich food supplement (6-59 mo)	All IYCF Practices (6-23 mo)
Lowest	24.2	23.2	98.6	84.9	50.6
Second	26.9	29.2	97.9	87.7	50.3
Middle	34.9	28.0	95.1	90.5	55.2
Fourth	38.3	30.4	97.2	90.0	62.4
Highest	45.7	44.6	94.1	84.8	74.4
Nepal	32.8	30.0	96.8	87.5	57.1

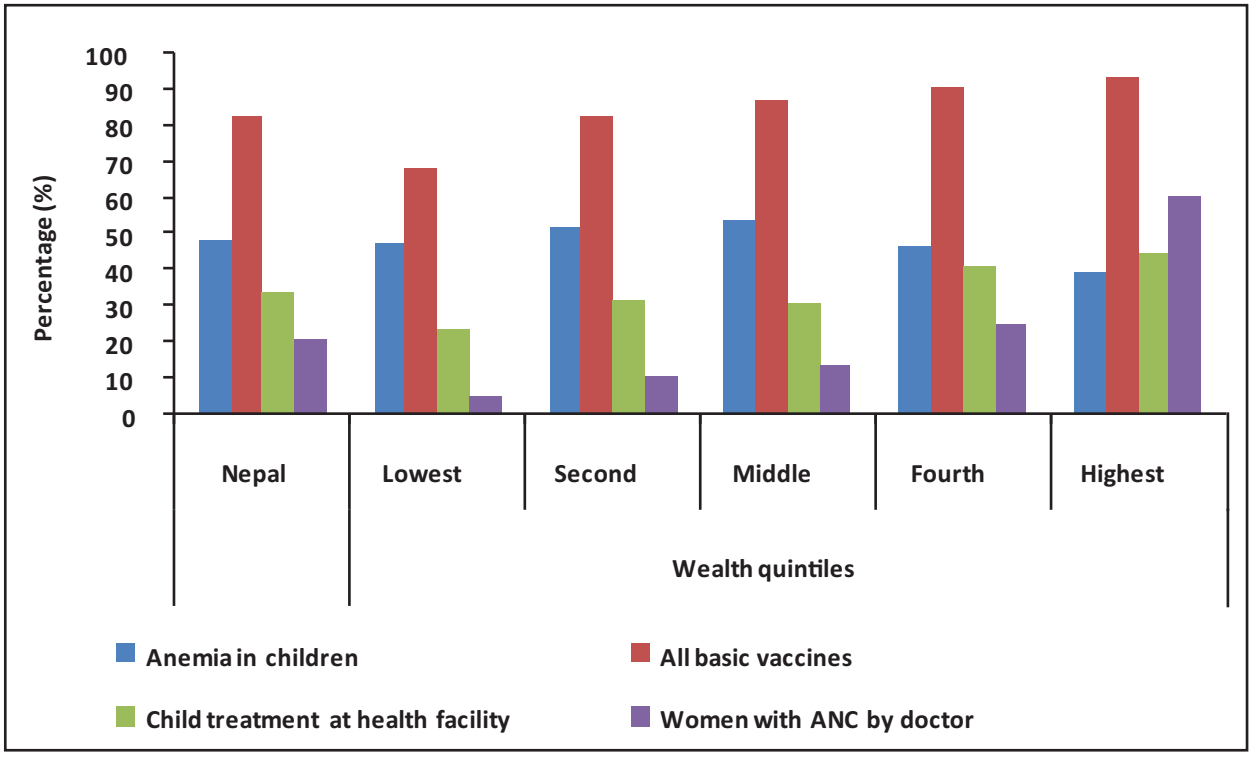
Source: NDHS 2006

access and literacy levels. The percentage of women with no education declines with as we go up wealth quintiles (Figure 6.2). Women's literacy plays an important role in determining the nutritional and health outcomes of their children. With increase in the level of educational attainment among mothers, the nutritional indicators for children show a marked improvement (Figure 6.3).

Also to be borne in mind is the fact that Nepal has significant variations in the distribution of wealth categories across regions. NDHS, 2006 classified the total households in the study into wealth quintiles based on the assets owned. Based on these wealth quintile cut-offs for the entire sample, the NDHS, 2006 report also provides the share of households in each sub-region falling within each of the quintiles. Figure 6.4 shows the share of households in each sub-region which fall within the cut-off for the bottom two quintile[1].In the Western and Eastern Mountain sub-regions and the Far and Mid-Western Hill sub-regions, more than 55% of the households fall within the cut-off for the bottom two wealth quintiles.

These observations highlight the inter-linkages between agriculture, income, absorption and utilization factors upon health and nutritional outcomes. However one must bear in mind that the effect of each of these individual variables remains to be estimated. For instance, while educational levels correspond to better nutritional outcomes, it is very likely that the income

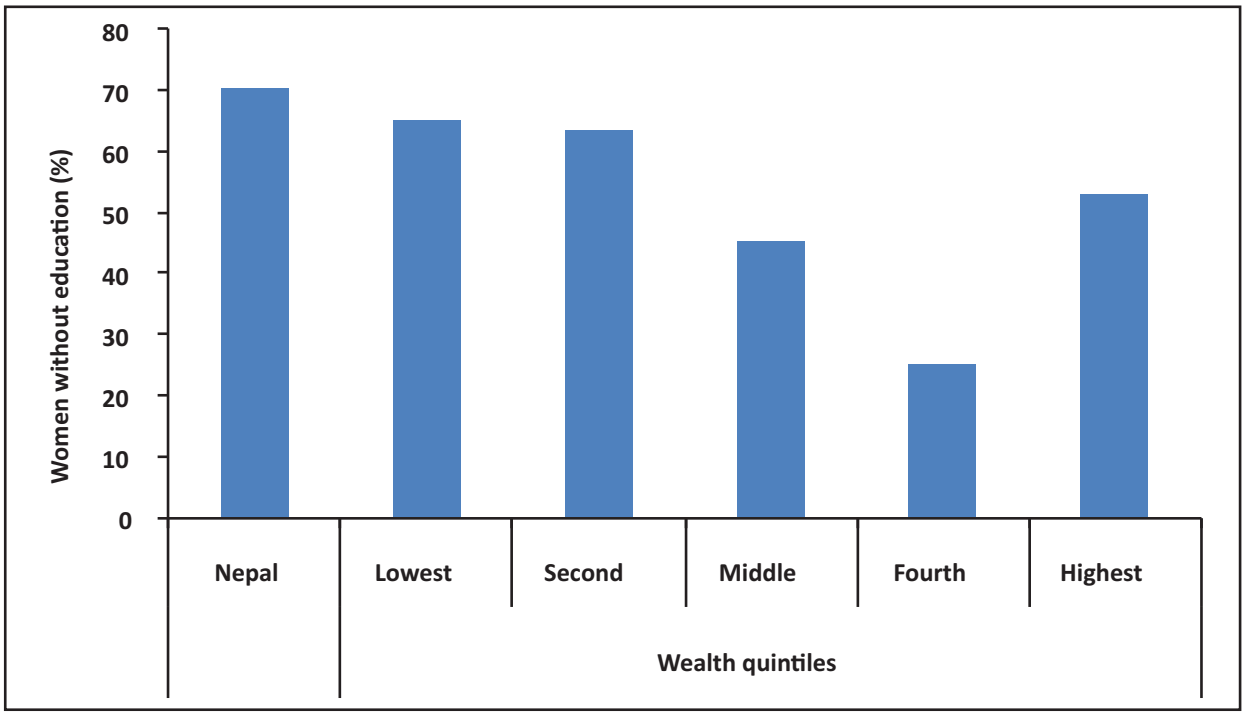
Figure 6.1 Health status and treatment as per wealth quintile, 2006



Source: NDHS, 2006

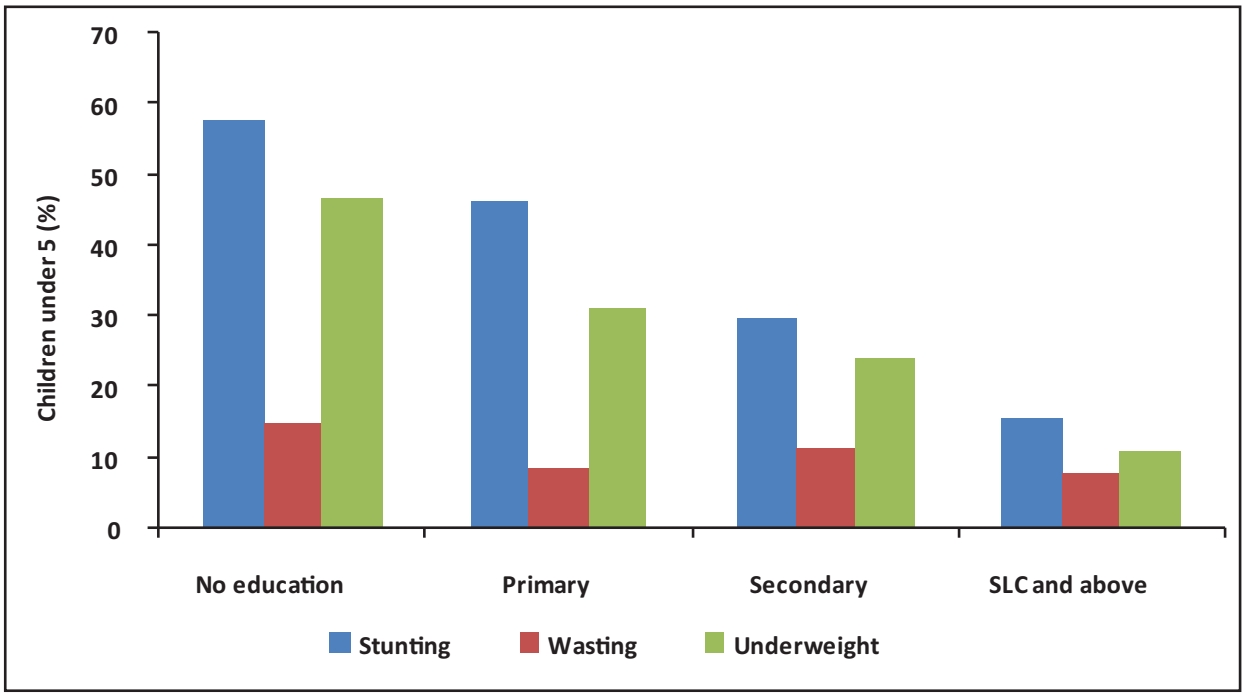
[1] NDHS data is covers 13 of the 15 sub-regions. No data was available for the Far and Mid-West Mountains.

Figure 6.2 Education and wealth quintiles



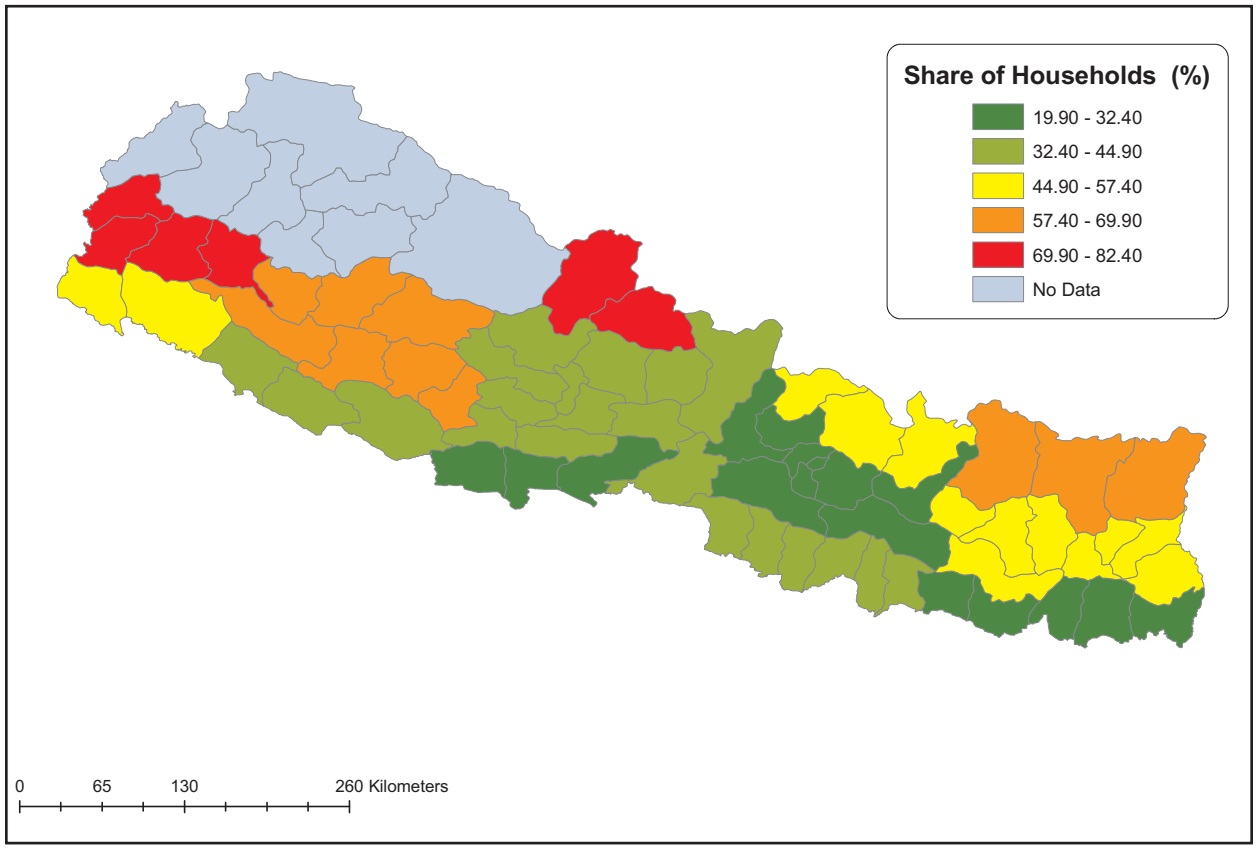
Source: NDHS, 2006

Figure 6.3 Child nutrition status and mothers education achievement



Source: NDHS, 2006

Figure 6.4 Share of households falling within cut-off for bottom two wealth quintiles in sub-regions of Nepal (2006)



Source: Map generated by Authors' based on data from NDHS (2006)

levels and education are likely to have a positive correlation. Nevertheless, it is clear that agricultural growth would have a positive impact on income levels for the poorest households (who are most dependent on farm incomes). This along with the provision to access quality food, education and health facilities would result in betterment of health and nutritional outcomes.

6.2 Correlation between Nutritional Outcomes and key Indicators

In a preliminary effort to explore some of the linkages between nutritional outcomes and agriculture, incomes/poverty and absorption factors (health/education), we attempt to first compute the correlation between key variables across key sub-regions. This exercise is attempted for only 2001 due to data unavailability for other years at present. A brief description of these variables is presented below:

Indicators of Nutritional Outcomes

As one single indicator of the level of malnutrition in the population is currently unavailable, we first construct a malnutrition index from available anthropometric indicators described in

section 4, namely the share of children under 5 years of age who suffer from stunting, wasting and underweight and share of women (aged 15-49 years) classified as thin (with BMI< 18.5 kg/m2). This enables us to capture the nutritional status of both children's population as well as adults to an extent. The data is taken from the Nepal Demographic and Health Survey 2001. Unfortunately the share of thin men is unavailable from these surveys and it would be useful to obtain these numbers for future research. Each percentage value is normalized using the formula;

$$Normalised\ \ Indicator = \frac{(Actual\ \ Values - Min\ \ Value)}{(Max\ \ Value - Min\ \ Value)}$$

The simple average of these 4 normalized figures is taken to arrive at the Normalized Malnutrition Index or NMI. This normalization method is also used by UNDP for computing the Human Development Index and has the advantage of making both child malnutrition and women BMI indicators scale free (Shariff and Gulati, 2009). In total nutritional indicators are available for 13 sub-regions in the NDHS surveys excluding the far-western and mid-western mountain regions. For future research it would be interesting to obtain data from these regions as they are considered amongst the most underdeveloped regions from existing socio-economic indicators as well as conflict-affected regions in the recent past. Table 6.3 presents the estimated NMI of the 13 sub-regions. The Central *Terai* region seems to be most undernourished. This is in keeping with the fact that this region is also amongst the poorest regions in Nepal. The Western mountains, hills and *Terai* follow the central *Terai* with poor nutritional status. The difference between the worst and best performers is significant- up to around 30% points in the case of stunting and underweight. Figures 6.5 & 6.6 present the computed NMI across Nepal's sub-regions based on the data for 2001 as well as 2006.

Table 6.3 Key Nutritional outcomes and normalized malnutrition index, 2001

Regions	% Stunted (h/a)	% Wasted (w/h)	% Underweight (w/a)	% Thin women (<18.5 BMI)	Normalized Malnutrition Index
Central *Terai*	51.5	18.1	58.6	42.8	0.830
Western mountain	66.1	8.6	64.2	25.4	0.720
Far Western hills	59.1	12.6	58.1	27.7	0.691
Mid-western hills	59.2	8.1	55.8	25.1	0.584
Western *Terai*	53.3	10.5	50.5	29.3	0.560
Far Western *Terai*	43.2	10.7	46.0	31.0	0.453
Eastern *Terai*	41.4	10.8	43.4	35.1	0.450
Central mountain	60.8	5.7	41.8	17.4	0.389
Mid-western *Terai*	37.0	8.7	40.8	24.5	0.278
Central hills	51.7	3.3	40.5	13.1	0.231
Western hills	47.9	4.2	39.9	13.1	0.207
Eastern hills	48.8	3.8	38.4	12.9	0.195
Eastern mountain	51.3	1.9	33.0	10.1	0.123
Nepal	57	11	43	26.7	0.519
Range	29.1	16.2	31.2	32.7	0.7

Source: NDHS, 2001 and authors estimates

Indicators of Economic and Agricultural Performance

As seen earlier, income/wealth seems highly correlated to not only food intake and consumption but also access to quality healthcare and education. But sub-regional or regional economic indicators are not published by the Central Bureau of Statistics on a regular basis in the National Accounts and made public. Thus indicators of sub-regional economic and agricultural production data are difficult to come by that can act as a suitable proxy for economic incomes/performance at a macro/sub-regional-level. This said one of the last relatively reliable estimates of economic performance at the sub-regional level is available from the Nepal Human Development Index 2004 by UNDP. The data available relates to Value added to the economy (i.e. Gross Domestic Product-GDP) by different sectors including Agriculture, forestry and fishery (Gross Domestic Product from Agriculture, forestry and fishery-GDPA) in the year 2001. Thus we have estimated the relation for this year only at present. In order to control for the population distributed across these regions, we have used per capita GDP and GDP based on sub-regional population estimates from the Nepal Census 2001. The values are indicated by variables 'pc_GSDP' and 'pc_GSDPA'.

As these estimates may not be reliable we have also used values of % women whole occupation was agriculture across regions from the Nepal Demographic and Health Survey 2001. Firstly the majority of households in agriculture are poor and secondly poverty is concentrated amongst agricultural sector workers. Given this it will be interesting to plot whether regions which have higher share of women in agriculture also see higher malnutrition. The variable is denoted by 'womenag'.

Indicators of Absorption/Utilization

In order to indicate the role of various absorption utilization factors we use the following indicators all from the NDHS, 2001 except the share of households without water supply access which is from Nepal Human Development Index 2004

- % Share of Literate women aged 15-49 denoted by 'womenlit'
- % Distribution of women who had a live birth in the five years preceding the survey without antenatal care (ANC) during pregnancy for the most recent birth denoted by 'womennoanc'
- % Share of women without folic acid: Among women who gave birth in the five years preceding the survey, percentage who did not take iron/folic acid tablets for specific numbers of days denoted by 'womennoiron'
- % Share of households without access to water supply denoted by 'nowater'.

Results

The correlation matrix, Table 6.4, shows some interesting results. Surprisingly, there seems to be little or no correlation between the level of economic/agricultural-performance denoted by pc_GSDPA/pc_GSDP and the malnutrition index. However, the share of women in agriculture and the level of malnutrition seem significantly positively related, with correlation coefficient at around 0.542 (Figure 6.7). Women's literacy rate also has a very strong relation with the level of malnutrition with a correlation coefficient high at -0.86. This only highlights

Figure 6.5 Normalized malnutrition index across sub-regions of Nepal - 2001

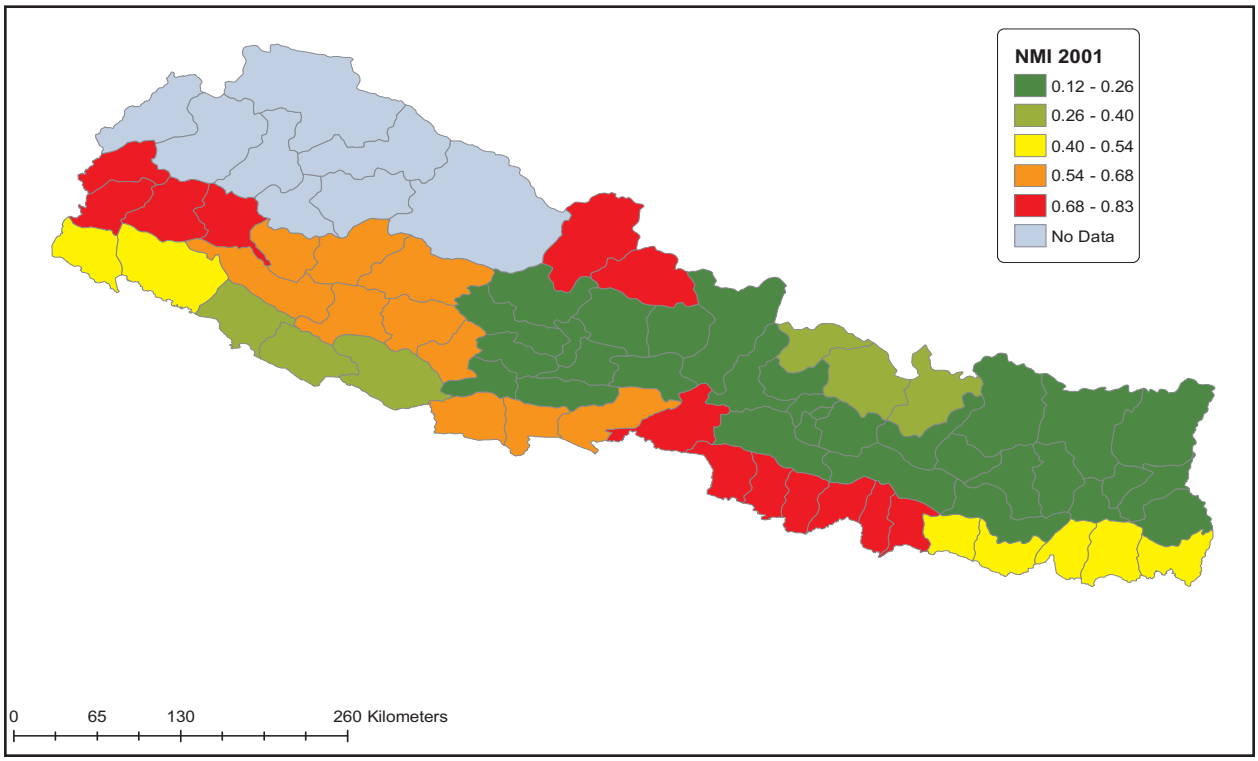
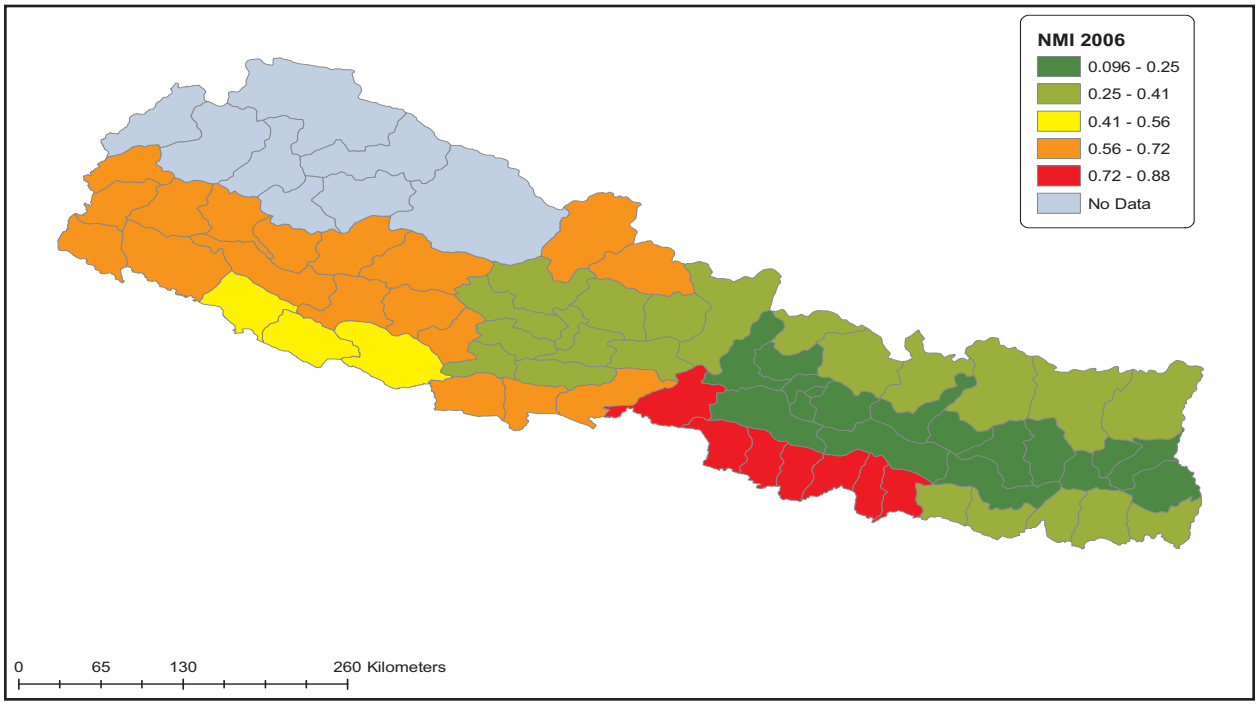


Figure 6.6 Normalized malnutrition index across sub-regions of Nepal - 2006



Source: Maps generated form Authors' computations based on data from NDHS, 2001 &, 2006

the pivotal role of women's education and empowerment in malnutrition. Figures 6.8 and 6.9 show the sub-region wise women literacy rate in Nepal in 2001 and 2006. Finally, access and utilization of health infrastructure also seems critical as seen by the high correlation between share of women using antenatal care facilities and malnutrition.

It must be stressed that these are only preliminary findings. Further research is needed to explore the linkages more accurately. The absence of correlation between agricultural performance and malnutrition is surprising and runs counter to the relationship observed in the case of India. Through regression analysis Gulati et al (2010) find that agricultural performance across 20 major India states has a strong negative relationship with indices of malnutrition constructed in a similar way as here. Their analysis controls for some of the factors known to have an influence on malnutrition amongst children and adults, such as women's literacy, household access to sanitation facilities and health care services.

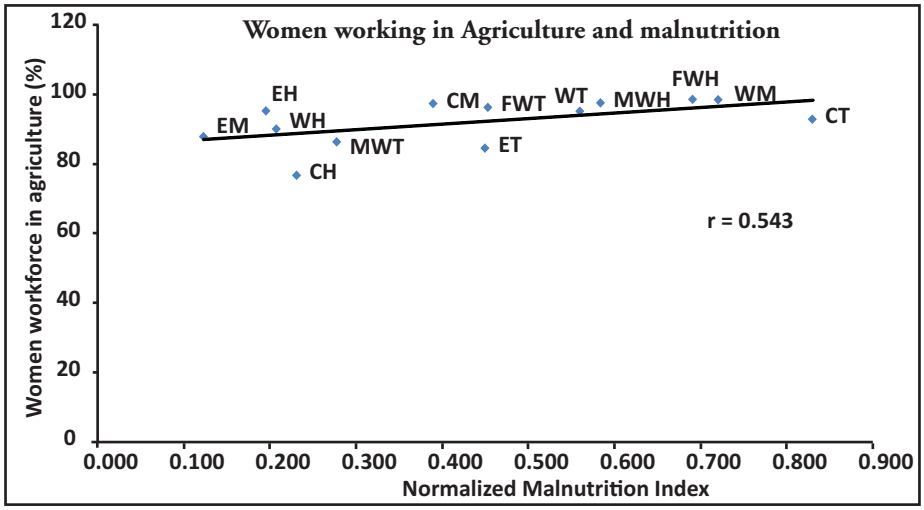
To conduct a similar analysis for Nepal requires better data at sub-regional level especially on economic and agricultural performance indicators. Additionally, in order to effectively capture the relation between poverty and nutritional outcomes across regions, poverty estimates for these sub-regions are also required. These are not readily available at present as the NLSS regions for which poverty estimates are published differ from the NDHS regions for which health and nutrition indicators are available.

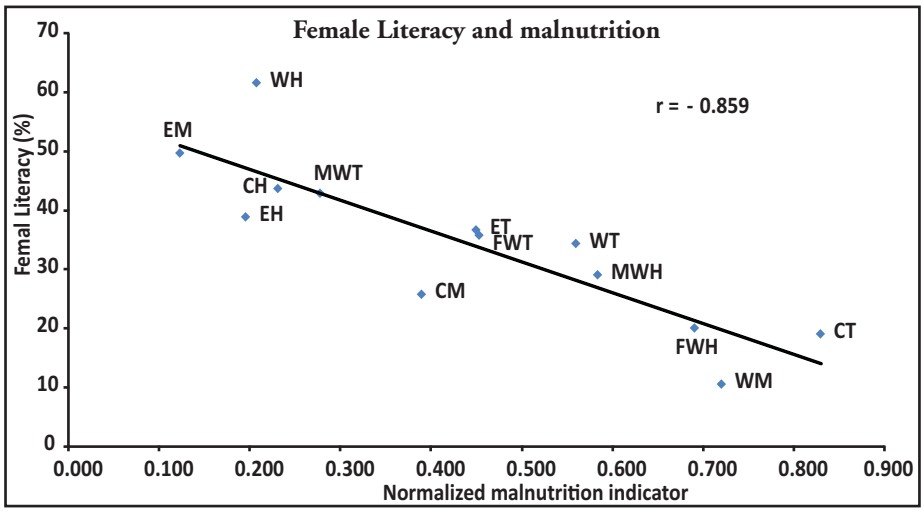
Table 6.4 Correlation matrix between key variables (2001)

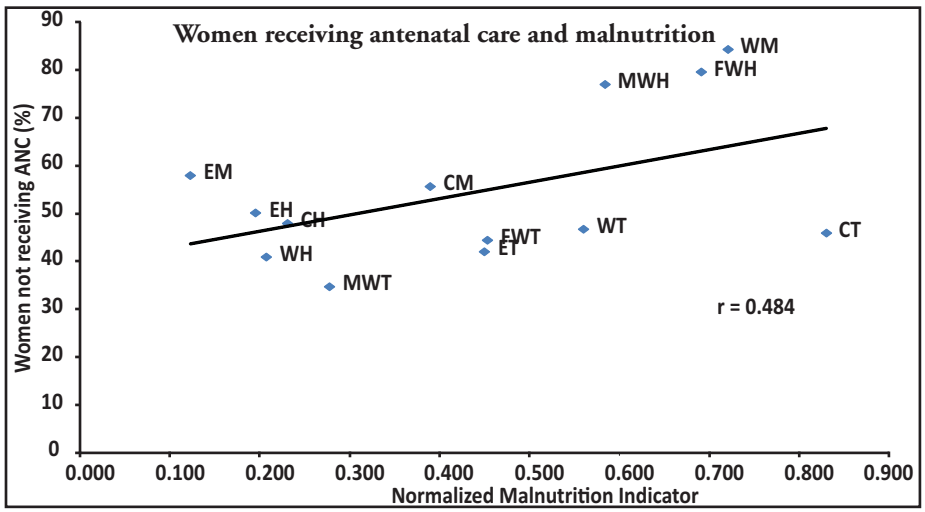
	NMI	pc_GSDPA	pc_GSDP	women_~t	women_~c	women_~n	womenag	nowater
NMI	1							
pc_GSDPA	0.018	1						
p values	0.9521							
pc_GSDP	0.095	0.5591	1					
p values	0.7567	0.047						
women_lit	-0.85**	-0.2028	-0.2354	1				
p values	0.0002	0.5063	0.4389					
women_noanc	0.48*	0.2884	0.2281	-0.635	1			
p values	0.0943	0.3393	0.4535	0.0197				
women_noiron	0.341	0.373	0.1258	-0.5557	0.8005	1		
p values	0.2532	0.2094	0.6823	0.0486	0.001			
womenag	0.54*	0.3008	-0.2563	-0.5859	0.5648	0.4901	1	
p values	0.0556	0.3179	0.3981	0.0354	0.0443	0.0891		
nowater	-0.034	-0.376	-0.4706	-0.0284	0.5156	0.4823	0.282	1
p values	0.9121	0.2054	0.1046	0.9267	0.0713	0.0951	0.3506	

Source: Authors calculations; Note: ** significant at 5% level; * significant at 10% level

Figure 6.7 Significant correlations







Source: Authors calculations Note: EM - Eastern mountain; CM - Central mountain; WM - Western mountain; EH - Eastern hills; CH - Central hills; WH - Western hills; WMH - Mid-western hills; FWH - Far Western hills; ET - Eastern *Terai*; CT - Central *Terai*; WT - Western *Terai*; WMT - Mid-western *Terai*; FWT - Far Western *Terai*

Figure 6.8 Women literacy rate across sub regions of Nepal – 2001

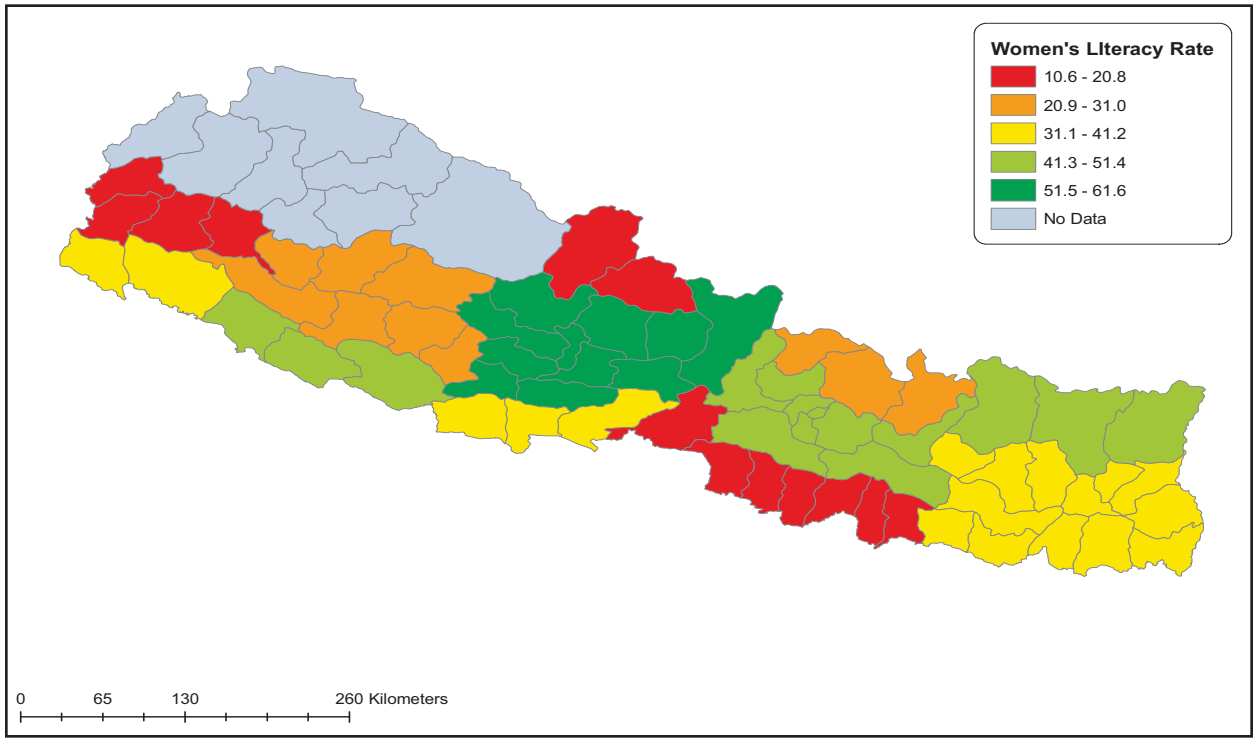
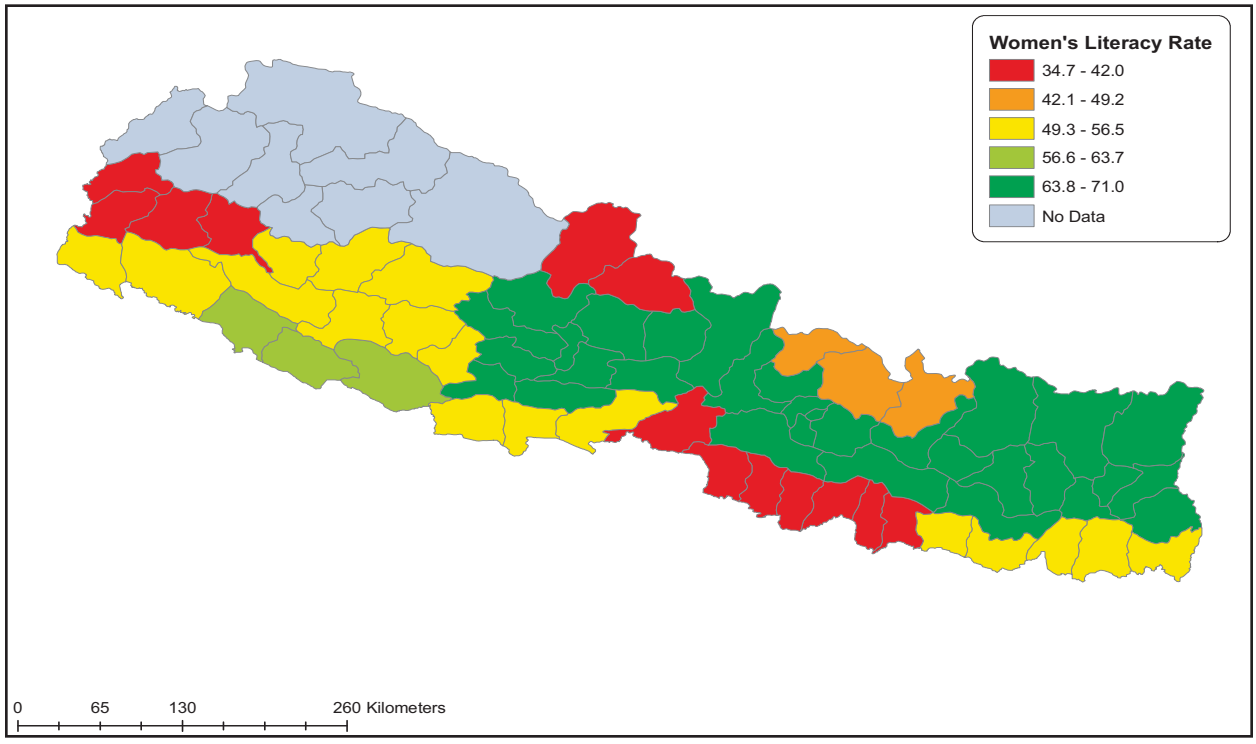


Figure 6.9 Women literacy rate across sub regions of Nepal – 2006



Source: Maps generated by Authors' based on data from NDHS, 2001 & 2006

Harnessing Nepal's rich water resources can pave the way for enhancing agricultural productivity and improving food and nutritional security

7 Way Forward

7.1 The Issues and Challenges

Increasing Agricultural Performance

From the discussions in the preceding sections, it is evident that Nepal is the only South Asian country where growth in cereal production trails behind population growth, and the country has been a net importer of cereals since the 1980s. Low growth in cereals production is the consequence of low use of inputs such as improved variety seeds, fertilizers, etc. Despite the slow growth in cereals output, per capita availability of cereals in Nepal is second highest in South Asia, due to the food imports especially across the open border with India. Although cereals occupy nearly three-fourths of the cultivated area, they have been losing importance in terms of share in the value of agricultural production. High value crops, especially vegetables and fruits, accounting for less than 7% of cultivated land, have been growing in importance in terms of value of output. The relatively high productivity of these crops is due to the greater use of modern seed varieties compared to cereals. Livestock products – milk and meat – too have been showing healthy growth though somewhat less than vegetables and fruits.

Agricultural performance shows substantial spatial variation – across both ecological zones and development regions. Growth is generally higher in the agriculturally well endowed regions of *Terai*, while it is significantly lower in the hill and mountains, especially in the Western, Mid-Western and Far-Western regions. Availability of arable land is a major constraint to agriculture in the country as a whole, especially in the hills and mountains. While water availability is less of a constraint in Nepal, irrigation development has trailed behind the needs of agriculture and plan targets have not been fully met. The use of key farm inputs – improved seeds, fertilizers, pesticides, and farm machinery – in Nepal depends crucially on their price in India, which is the major supplier of most of these inputs. Besides, the low research capacity to provide high quality seeds, the poor / absent extension services (including extension related to animal health) and the low availability of formal credit for agriculture are other major constraints to agricultural growth.

Addressing Hunger and Malnutrition

The study reveals prevalence of substantive differences in food and nutritional insecurity from one area to the next. At the same time, Nepal has done extremely well in scaling up and to date sustaining micronutrient interventions. The country has received justified global recognition for this achievement. These programs have had impressive impacts on child mortality (vitamin A supplementation) and maternal anemia (iron intensification program).

Fortification programs targeting the general population (salt iodization and iron fortification of wheat flour) are also largely on track.

Poverty, economic activity, agricultural productivity, access to basic services like health facilities and food markets all play a role. The analysis points out that increased economic growth in many of the remote sub-regions is urgently required to combat poverty, which is a key underlying factor to the hunger problem in Nepal. Economic growth, preferably through increased investments in a much neglected agricultural sector is critical as poverty is increasingly getting concentrated amongst agricultural households. Therefore, to address poverty and hunger in Nepal, a substantive and urgent effort is required to increase agricultural production, improve market infrastructure and ensure access to food by all population groups.

Economic growth is, however, not enough. Investments in multi-sectoral interventions addressing food availability and household access as well as direct nutrition interventions are important to effectively reduce malnutrition. This includes investing in the health sector, increasing nutritional awareness, improving behavioral practices such as hand washing, breast feeding and water treatment, and providing access to proper sanitation facilities for rural populations. In addition, sufficient access to food need to be ensured to the most vulnerable, including the landless, disadvantaged ethnic groups, female headed households, elderly and handicapped, through targeted social protection programs.

Targeting needs to be undertaken at several levels. These include use of the Health Monitoring and Information System (HMIS), monthly report of underweight children from health facilities and the WFP food security monitoring systems, which provide information on a range of indicators including food prices and predicted food availability. The micronutrient programs provide a foundation upon which to strengthen the delivery of other health sector interventions addressing general undernutrition that are not on track – particularly those addressing feeding and care behaviors: in particular breast-feeding, complementary feeding, and hygiene and sanitation.

Gender, Governance and Issues of Regional Access

The increasing number of female headed farm households poses several challenges. Many of the female headed farm households practice subsistence farming, but get supplementary income from remittances by other family members who migrated. While this leaves them relatively better off in comparison to households solely dependent on farm incomes, nevertheless it is important to improve the productivity of these female headed farm households and link them to markets for sustained impacts on their food and nutrition security.

The study clearly reveals a very critical role of women in addressing nutritional security in Nepal at policy to implementation levels. However, poor education on health and nutrition, inadequate access to food, limited employment opportunities, and their role in policy decisions and program implementation have posed serious constraints in making sustainable impacts. New interventions need to address these with the capacity building of women through desired trainings and exposures. There have been positive effects on household nutrition with women education. Locally available healthy foods, food fortification, health and sanitation

at the household and community levels can make tremendous impacts. Similarly, FCHW are instrumental to the health and nutritional initiatives. They need to be trained, motivated and institutionalized for increased performance and contributions.

Tackling issues of governance is crucial to ensure a stable, conducive environment for much needed investments at the national level as well as to ensure effective implementation of current policies and programs.

Another recurrent theme which has frequently surfaced is the wide regional variation in different aspects of food security from food production and prices to poverty reduction and rates. In many instances western regions and mountainous and hilly belts often lag behind national average (although certain parts of the *Terai* also fare badly). Thus spatial factors and terrain need to be specifically factored in while addressing food security challenges in Nepal as the nature of issues of both income generation as well as consumption/prices are regionally differentiated.

In order to effectively eradicate poverty and raise household incomes sustainable and remunerative income opportunities need to be created. Cropping of high value crops such as fruits and vegetables, spices or livestock rearing rather than cereal crops maybe more advantageous. But in order for people to really benefit from agriculture, linkages to markets and agro-processing units are needed. Alternative sectors like eco-tourism are also feasible options as one of the most significant assets available in these regions are ecology and scenic beauty. But in order to leverage this infrastructure and connectivity improvements in roads, airways and telecom are critical. Better connectivity would also bring down the cost of transporting goods and services produced outside the region and thus bring down consumption prices.

7.2 Possible Investment Options and Directions

From a policy perspective, it is critical to recognize that the open border with India affects agricultural profitability in general in Nepal – both with regard to output price and also due to the country's dependency on imported inputs. In particular the price of paddy, the main crop in terms of land allocation in Nepal and hence farmers' livelihood, is crucially linked to the Indian price (which itself is heavily influenced by the Indian government's policies). On the output side, Nepal currently does not have a credible set of institutions to offer price support to its farmers, and in any case the experience of several other countries show that such policies often distort the incentive structure across crops with several undesirable side-effects. Input subsidization policies is unlikely to be a sustainable option either as the country is fully / almost fully dependent on imports and also due to the weak fiscal situation of the country.

Under these circumstances, Nepal's options could be to pursue policies aimed at improving farm productivity in general without directly intervening in particular commodity output or input markets. The objective should be to boost farm employment and incomes so that poverty and incidence of hunger is reduced. Focusing on high value agriculture – fruits and vegetables, herbs and medicinal plants, dairy and livestock products – is likely to yield better outcomes. Alongside, efforts have to be made to improve the extension services and farmers'

access to credit. Some of the broad investment options available over the short-, medium- and long-term are listed in Table 7.1.

But agricultural growth, which may be critically important, may not be a sufficient condition to improve child nutrition. Ensuring adequate food alone will not address the problem of hunger and undernourishment in Nepal. Investments are required to improve the poor's access to food. At the same time efforts have to be made to improve food absorption and utilization. For that, Nepal will have to invest in female education, general sanitation, basic health care, and some selected direct nutrition interventions. Multi-sectoral efforts are needed to improve preventive measures, and improve management of simple infections. Besides, efforts have to be made to change selected behaviors through information and education campaigns. Table 7.2 and 7.3 list some of the investment options to be considered here for improving access and absorption.

It must be cautioned however that these options are based on very preliminary exercise undertaken in this report, and more research is required to develop them into more robust investment options. Finally, considering the large regional heterogeneity in Nepal, it may be difficult to come up with a one-size-fit-all food security strategy suitable to all the regions and income groups purely by the central government. Any strategy has to be fine tuned to the local conditions, and in this local governments have to play a more active role in promoting local economic development for which efforts must be made to ensure effective participation of the local governments.

A woman vegetable farmer using an affordable drip-irrigation system

Table 7.1 Improving agricultural productivity

Issues/Challenge to be addressed	Possible Investment Options and Directions			Lead Agencies/ Institutions involved
	Short-term	Medium-term	Long-term	
Seeds	Bringing in policy changes which ensures that the quality and suitability of unofficially imported seeds for local conditions to safeguard farmer interests.	Collaborating with international research institutions and neighboring countries (govt. and pvt. Sectors), to develop new varieties and develop domestic capacity to adapt the imported improved seeds varieties to local conditions.	Building adequate supply side infrastructure for timely supply of inputs and reduced transportation costs.	Government (MoAC, NSC, AIC) Partners: Research agencies – domestic & international (NARC, CIMMYT, IRRI etc.) Private sector Donor agencies
Fertilizers With complete dependence on imports for chemical fertilizers price subsidy may not be sustainable in long term	Improving delivery mechanism for current subsidy is required.	Build capacity to revive the traditional practices of using organic farm manure, which would be cost effective and environmentally sustainable in some regions of Nepal		
Irrigation	Shallow tube wells have advantages in terms of low capital requirement, low lead times, and quick returns to investment. Measures for improving farm credit for STWs are required. Micro-irrigation systems extension – especially for horticulture/other high value crops can help increase productivity. Deep tube wells in areas which require all year round irrigation, and have access to ground water	Capacity building of FMIS and WUAs for better cost-recovery and improved maintenance of existing public irrigation systems. Planned watershed development for ensuring sustainability of resource and developing alternate water storage/ irrigation systems for Hill/ Mountain regions.	Improving rural farm power supply infrastructure. Negotiating mutually beneficial water sharing agreements with neighboring countries and work together for harnessing surface water resources for irrigation and hydro-power.	Government (MoI & MoAC, NPC) Partners: Co-operatives and farmer organizations Civil society Credit agencies and financial institutions Other Governments Donor agencies

(Contd.…)

Table 7.1—Contd.

Issues/Challenge to be addressed	Possible Investment Options and Directions			Lead Agencies/ Institutions involved
	Short-term	Medium-term	Long-term	
Research Because of the large regional variation and rather small market size, Nepal may lack the necessary economic scale for research, especially from the private sector. Hence it might be more viable to look at partnering with international research agencies and other countries.		Increasing investments for public agricultural research and extension – augmenting research infrastructure, trained manpower at all levels. Developing and strengthening regional research hubs for research focused on region specific crops and varieties.		Government (MoAC, NARC) Partners: Civil society agencies (NGOs/INGOs) Regional co-operation: International research agencies Governments and public agricultural research agencies of other countries Donor agencies
Extension	Building partnerships with NGOs for augmenting financial and manpower resources may help improve outreach.	Capacity building of agricultural-extension staff at grassroots. Developing ICT based extension tools for targeting remote districts		
Rural Credit	Support for savings and credit co-operatives for providing agricultural credit	Broader set of efforts for increased financial inclusion, extension of formal banking services		Government (NPC, MoAC, Nepal Rastra Bank) Partners: Banks and other financial organizations Co-operative Federation Civil society agencies Donor agencies
Output marketing & infrastructure	Clarity in agricultural marketing policies and clear laws for encouraging direct purchase arrangements between organized private sector – farmers/farmer co-ops while ensuring fair returns to farmers.	Encouraging agro-processing activities and improving value chains	Road connectivity: A good network of roads is critical to ensure food security in remote areas and spur commercial agri-culture especially in high value products	Government (NPC, MoAC, Ministry of Physical Planning &Works, Dept. of Roads) Partners: Private sector Donor agencies

Table 7.2 Improving access

Issues/Challenge to be addressed	Possible Investment Options and Directions			Lead Agencies/ Institutions involved
	Short-term	Medium-term	Long-term	
Rural non-farm enterprises		Improved support for existing co-ops/ forestry user groups etc. to undertake rural non-farm commercial enterprises on small scale. Agro-processing activities in rural areas can be doubly beneficial in terms of creating employment and commercializing agriculture for sustained income generation.		Government (Ministry of Physical Planning &Works, Dept. of Roads; MoAC) Partners: Private sector (FNCCI, AEC) Civil society agencies Donor agencies
			Improving rural infrastructure – power and roads	
Safety Nets	Strengthening implementation of existing safety net programs such as the food-for-work program, especially in remote hills and mountain regions, can be useful to prevent harmful coping strategies of vulnerable population and to create community rural infrastructure. This requires improved co-ordination between various implementing agencies, local government, community and the centre.		Improved road infrastructure for lower transportation costs	Government (Ministry of Industry ,Commerce & Supplies, NFC; MoAC, Ministry of Local Development) Partners: Civil Society Agencies Donor agencies
		Improving efficiency and effectiveness of the public food distribution system		

Table 7.3 Improving absorption and utilization

Issues/Challenge to be addressed	Possible Investment Options and Directions			Lead Agencies/ Institutions involved
	Short-term	Medium-term	Long-term	
Literacy	Existing programs such as Education for All, Secondary Education Support Program, Community School Support Program and Teacher Education Project need to be sustained.	The School Sector Reform Plan 2009-15, which is already underway, needs to be implemented effectively to comply with the time bound targets that have been envisaged. Since mothers' education level is found to be important for children's health status, it is important to continue to promote girls' enrollment in both elementary and secondary schools		Government (DoE; various departments of the Ministry of Population & Health, Ministry of Local Development) Partners: Civil society agencies Donor agencies Local Community
Health & Sanitation	Strengthening the link between the Ministry of Local Development and the MOHP for advocacy, education and capacity building, and infrastructure supports for drinking water and sanitation to targeted regions and households.	Counseling to improve infant and young child feeding (IYCF), hygiene and sanitation through both health centers and communities. Using effective communication tools through mass media and building capacity in these skills for local health workers	Implementing the recommendations of the "Nutrition Assessment and Gap Analysis" (NAGA), 2009 and the long-term strategies of the National Nutrition Action Plan (NNAP) in a time-bound and effective manner.	
Nutrition Interventions	Supplementation and fortification programs that have been introduced need to be maintained and strengthened where possible. Specific measures to combat micro nutrient deficiencies (such as iodine, vitamin A, iron, zinc) are also required.	Community-based advocacy for health and nutritional programs, including school health, nutrition and feeding programs need to be scaled-up.		

Knowledge Gaps and Need for Further Research

Role of Partnerships

The food and nutritional security interventions to improve availability, access and absorption are cross-cutting in nature and would involve the government, bilateral and multilateral donors, private sector, civil society bodies, and the communities themselves. To reduce undernutrition on a national scale, the investment options listed above need to be designed and delivered in a coordinated manner. Food quality and safely laws, their effective implementation and monitoring also have important role to promote food and nutritional securities in the country. Actual investments have to be based on a rigorous assessment of the costs and benefits over the short-, medium- and long-run. Here knowledge partners – both national and international – can play a critical role in ensuring that optimal investment strategies are arrived at, and the programs are well designed with clearly laid out indicators for outcome monitoring.

7.3 Knowledge Gaps and Need for Further Research

The investment options listed above provide a possible direction for intervention based on the stock taking exercise carried out in the previous sections. To identify priorities and to develop a specific investment strategy further research is required to close several knowledge gaps that continue to exist. Some of the important gaps in data and research that needs to be probed further include the following:

- An analysis of the marginal rates of return (in terms of growth impact and poverty reduction) of various investment options- like roads, irrigation etc. needs to be carried out in order to identify priority sectors for a productive and efficient public sector investment strategy.

- Currently, the extent of food deficit in the country both nationally and at a regional level is assessed using the food balance sheets published by the Ministry of Agriculture and Co-operatives (MoAC). At the national level, the food balance sheets are constructed following the broad approach laid out by the Food and Agriculture Organization (FAO). During discussions with Ministry officials it was clarified that at the national level the food requirement is kept fixed at 191.1 kg of cereal/capita/year and adjustments are made for population growth. This per capita food requirement may not reflect the true consumption or demand for cereals. Hence the food balance sheets may not paint an accurate picture of actual deficit or surplus in the country as a whole.

- Most food security assessments in Nepal have been based only upon past performance trends. There is a need for forward looking projections which can help build future food supply and demand scenarios in Nepal which are required in order for the government to plan and strategize accordingly.

- Food interventions at the regional level are guided by the estimates of deficit based on regional food balance sheets. These regional food balance sheets have fixed food requirement per capita, which however vary across regions. Further, only the regional production

is considered here, and inter-regional food trade is ignored for want of data. Thus, these regional food deficit estimates too may not present an accurate picture of the ground realities. This might be a reason why the food balance approach gives a different picture of nutritional outcome from that based on health and nutritional surveys. Better data and estimation techniques are in order to improve the targeting and delivery of food based interventions.

- The functioning of the food management policies and systems needs to be assessed with regard to the pricing, procurement, stocking and distribution. The role of the parastatal agencies involved here such as the NFC, their efficiency and effectiveness in delivering affordable food needs to be critically evaluated. In this regard, comparison with the cost-effectiveness of the private sector in different aspects of food management is essential to evaluate the policy options, viz., through public sector or private sector or through public-private partnerships.

- The possibilities of fulfilling the food requirement with enhanced production and product diversification of tubers (potato) and root crops, especially in the mountain and hill districts, and the possibilities of supplying nutritional diets through livestock products, fish, fruits and vegetables needs to be explored.

- Economic implications of human health related issues associated with zoonotic/trans-boundary diseases, nutrition support programs also need to be considered and analyzed

- The open border with India has been cited as an important factor in ensuring adequate supplies of food and farm inputs. While there is evidence suggesting a close relationship between food prices in Nepal and India, the impact of this on food and agricultural production in Nepal is under researched.

- Related to the above, the role of trade policies in Nepal and in other countries in general also comes into question. In particular, the possible effects of regional trading and food stocking arrangements need to be evaluated to ensure national level food security.

- A few studies in the literature have pointed out significant price spread across different regions of Nepal. While terrain and the consequent high transport costs have been cited as one of the reasons. The cost-effectiveness of alternate modes of transport, however, needs to be assessed to design food intervention programs for remote and food deficit areas. Further the role of trading structures in the price build-up across regions also remains to be understood to take effective measures to reduce trade margins and to stabilize prices.

- Diversification towards high value agriculture is largely restricted to the *Terai* region and some hill districts close to urban centers. Scaling up high value agriculture, however, requires a proper understanding of the constraints faced by the producers, processors and traders of these high value products. Value chain studies are far and few in Nepal. This is the case even with regard to paddy / rice. This is a major knowledge gap that needs to be addressed for effective policy intervention to improve agricultural productivity. It would

be useful to conduct in-depth case studies on successful stories to understand how to figure out a location's comparative advantage and scale the supply chain up.

- Irrigation potential in Nepal remains to be fully tapped. While ground water irrigation by shallow tube wells is cited widely in the past as a policy option, the constraints to developing this is on a large scale need to be identified. Further, for developing surface water irrigation and hydro electric plants possible policy options including partnering with other riparian states need to be explored.

- Nepal depends on imports for its farm inputs, especially seeds and fertilizers. Given this import dependency, the options for improving land productivity need to be studied in detail for individual crops.

- One of the looming uncertainties facing agriculture in Nepal is the impact of climate change on crop yields and water availability in particular. Assessment of the likely climate change impacts is critical to gauge the long-run food security scenarios.

- Turning to issues relating to food access, identification, monitoring and evaluation of the various safety net programs is necessary to assess their impacts on the vulnerable and to design large-scale future interventions.

- A better understanding of the role and impact of remittances on Nepal's macro- and micro economy and society.

- With the growing number of female headed farm households due to increasing male migration, and the wage differential between male and female workers, it is important to first of all assess the impact of remittance and economic conditions of women and female headed households. This could lead to improved understanding of the special constraints faced by rural women in entering the labor market and to improve farm productivity.

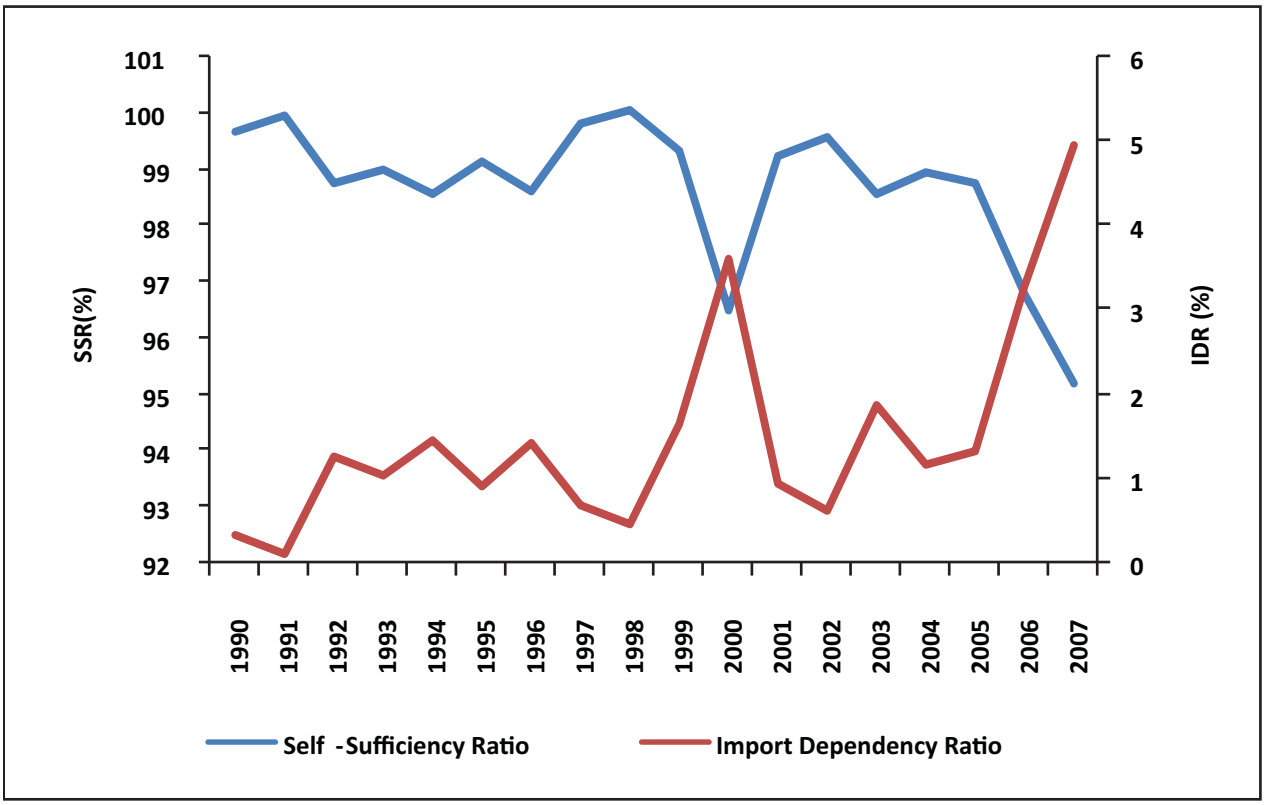
- The linkage between agriculture performance, poverty and malnutrition across regions in Nepal is another area for research to dovetail agriculture and nutritional policy interventions.

The above list of issues is by no means exhaustive. But these are some of the glaring knowledge gaps that need to be filled for effective policy response to improve food and nutritional security in Nepal.

Annexure

A.1: Availability

Figure 1A.1 Nepal: self sufficiency ratio (SSR) and import dependency ratio (IDR) for cereals (1990 – 2007)



Source: AO, 2010 Note: SSR is defined as production/(production + imports – exports) and IDR as Imports/ (production + imports – exports).

A.2: Constraints to Enhancing Agricultural Performance

Table 2A.1 Cultivated land per person and per household (2000)

Region	Cultivated land per person (ha)	
	1981 based on LRMP 1978/79 land use statistics[1]	2001 based on JAFTA 2000 land use statistics[2]
Mountain	1.047	0.307
Hill	0.223	0.163
Terai	0.219	0.167
Nepal	0.29	0.175

Source: Subedi, 2003. Note: * Land Resource Mapping Project (LRMP) (1986). Land Utilization Report, 1978/79. Kathmandu: LRMP. # Land use statistics based on Japan Forest Technology Association (2001), Information System Development Project for the Management of Tropical Forest. Later estimates for land use in Nepal are not available.

Table 2A.2 Cultivated, irrigable and actually commanded area (in '000 ha) across ecological regions in Nepal (1997/98)

Area and Use	Mountains		Hills		*Terai*		Total	
Cultivated area	227		1055		1359		2641	
Irrigable Area (including forest land)	61	(26.9%)*	373	(35.4%)	1744	(128%)	2178	(82.5%)
Irrigable Area (excluding forest land)	60	(26.4%)	368	(34.9%)	1338	(98%)	1766	(66.9%)
Irrigable Area (infrastructure developed)	52	(22.9%)	253	(24.0%)	786	(58%)	1091	(41.3%)
Actually commanded	40	(17.6%)	208	(19.7%)	520	(38%)	768	(29.1%)
Commanded as % of irrigable area	66.7%		56.5%		38.9%		43.5%	

Source: NENCID, 1999. Note: * Percentages in parentheses indicate percentage of total cultivated area

A3: Economic Access

Table 3A.1 Poverty head count (%) and distribution of poor population (%), Nepal

Region	Sub-region	Poverty headcount (%)			Distribution of the poor population %		
		1995-96	2003-04	% Change	1995-96	2003-04	% Change
Nepal		41.8	30.8	-26	100	100	-
Residence	Urban	21.6	9.6	-56	3.6	4.7	30
	Rural	43.3	34.6	-20	96.4	95.3	-1
Ecological belts	Mountain	57	32.6	-43	10.7	7.5	-30
	Hill	40.7	34.5	-15	41.9	47.1	13
	Terai	40.3	27.6	-32	47.4	45.4	-4
Development regions/ sub-regions	Eastern	38.9	29.3	-25	21	23.4	12
	Central	32.5	27.1	-17	26.9	32.2	20
	Western	38.6	27.1	-30	18.7	16.7	-11
	Mid-western	59.9	44.8	-25	18.5	17.7	-4
	Far-western	63.9	41	-36	14.8	9.9	-33
	Kathmandu	4.3	3.3	-23	0.3	0.6	118
	Other urban	31.6	13.0	-59	3.3	4.1	23
	Rural Western Hill	55.0	37.4	-32	32.7	23.6	-28
	Rural Eastern Hill	36.1	429.	19	19.4	29.4	51
	Rural Western *Terai*	46.1	38.1	-17	18.4	18.9	3
	Rural Eastern *Terai*	37.2	24.9	-33	25.9	23.5	-9

Source: CBS, 2005

Table 3A.2 Poverty rates and distributrion in selected groups

Region	Sub-region	Poverty headcount (%)			Distribution of the poor population%		
		1995-96	2003-04	% Change	1995-96	2003-04	% Change
Poverty by employment sector of the household head							
Self-employed	Agriculture	43.1	32.9	-24	60.7	66.9	10
	Manufacturing	41.4	31.2	-25	3.4	4.5	32
	Trade	32.2	11.1	-66	4.3	1.6	-62
	Services	25.3	14.4	-43	1	1.5	53
Wage earner	Agriculture	55.9	53.8	-4	15.7	10.9	-31
	Professional	8.3	2.1	-74	0.4	0.2	-53
	Other	39.7	28.8	-28	10.6	10	-6
	Unemployed	9.5	2.9	-69	0.1	0	-68
	Nonactive	30.5	26.9	-12	3.9	4.4	14
Poverty measurement by land ownership in Nepal							
Land Holding by Ha	Less than 0.2	48	39	-17	23	25	10
	0.2 - 1	45	38	-15	44	51	17
	1 – 2	39	27	-29	19	16	-14
	More than 2	39	24	-39	15	8	-49
	Total	43.3	34.6	-20	100	100	-
Poverty rates in female headed households,							
Female-headed	41.6	23.8	-43	8.5	11.1	31	8.5

Source: CBS, 2005

Table 3A.3 Employment patterns in Nepal, 1995-96 and 2003-04 (%)

Group	Men		Women	
	1995/96	2003/04	1995/96	2003/04
Total Agriculture				
Urban	17.9	20.9	50.2	54.6
Rural	75.5	74.2	93.9	94
Poorest 2 quintiles	76.7	76.5	95.1	96.4
- Self-employment agriculture				
Urban	13.8	19.9	42.7	51.8
Rural	60.8	64.9	82.4	85.4
Poorest 2 quintiles	58.4	63.5	79.4	83.4
- Wage employment agriculture				
Urban	4.1	1	7.5	2.8
Rural	14.7	9.3	11.5	8.6
Poorest 2 quintiles	18.3	13	15.7	13
Total Non-Agriculture				
Urban	82.1	79.1	49.8	45.4
Rural	24.5	25.8	6.1	6
Poorest 2 quintiles	23.3	23.5	4.9	3.6
- Wage employed unskilled Non-agriculture				
Urban	38.4	32.3	16.4	12.8
Rural	12.7	12.7	1.5	1
Poorest 2 quintiles	14.6	15	1.6	1.6
- Others*				
Urban	43.7	46.8	33.4	32.6
Rural	11.8	13.1	4.6	5
Poorest 2 quintiles	8.7	8.5	3.3	2

Source: CBS, 2005. * Others refer to share of self-employed in manufacturing, services and trade and wage earners in skilled non-agricultural-activities.

Table 3A.4 Share of household income in Nepal, 1995-96 and 2003-04 (%)

Source	Urban			Rural			Nepal		
	1995-96	2003-04	% Change	1995-96	2003-04	% Change	1995-96	2003-04	% Change
Farm income	11	7	-33.7	48	38	-20.3	43	29	-32.2
Agricultural wage income	1	1	-46.4	11	7	-30.4	9	5	-42.2
Non-agricultural wage income	27	27	-1.2	12	15	24.6	14	19	31.4
Non-agricultural enterprises	28	24	-13.3	10	11	12.5	12	15	23.1
Property income	2	3	10.0	1	1	-2.7	1	1	43.3
Remittances income	4	10	160.7	8	15	89.7	8	14	82.8
Housing income	22	24	6.9	9	8	-7.8	11	13	20.2
Other income	4	5	10.1	2	4	104.8	2	4	85.8
Farm/Agricultural income	12	8	-34.9	59	46	-22.1	53	35	-33.9
Non-Farm Income	84	82	-2.2	33	39	17.0	40	51	29.3
Remittances income	4	10	160.7	8	15	89.7	8	14	82.8

Source: CBS, 2005

Table 3A.5 Sources of household income (2003/04, % share)

Regions/Groups	Farm Income	Nonfarm income	Remittances	*Other
Development Region				
East	53	26	11	11
Central	47	32	9	13
West	40	24	17	19
Mid West	52	30	8	11
Far West	54	21	11	14
Ecological Zone				
Mountains	59	19	9	13
Hills	45	28	11	17
Terai	49	28	12	11
By Residence				
Urban	13	54	10	23
Rural	55	23	11	11
Consumption Quintile				
Poorest	62	23	8	7
Second	58	25	9	11
Third	56	24	10	10
Fourth	47	25	14	14
Richest	25	38	13	24
Nepal	48	28	11	14

Source: CBS 2005. * Includes rental value of own house

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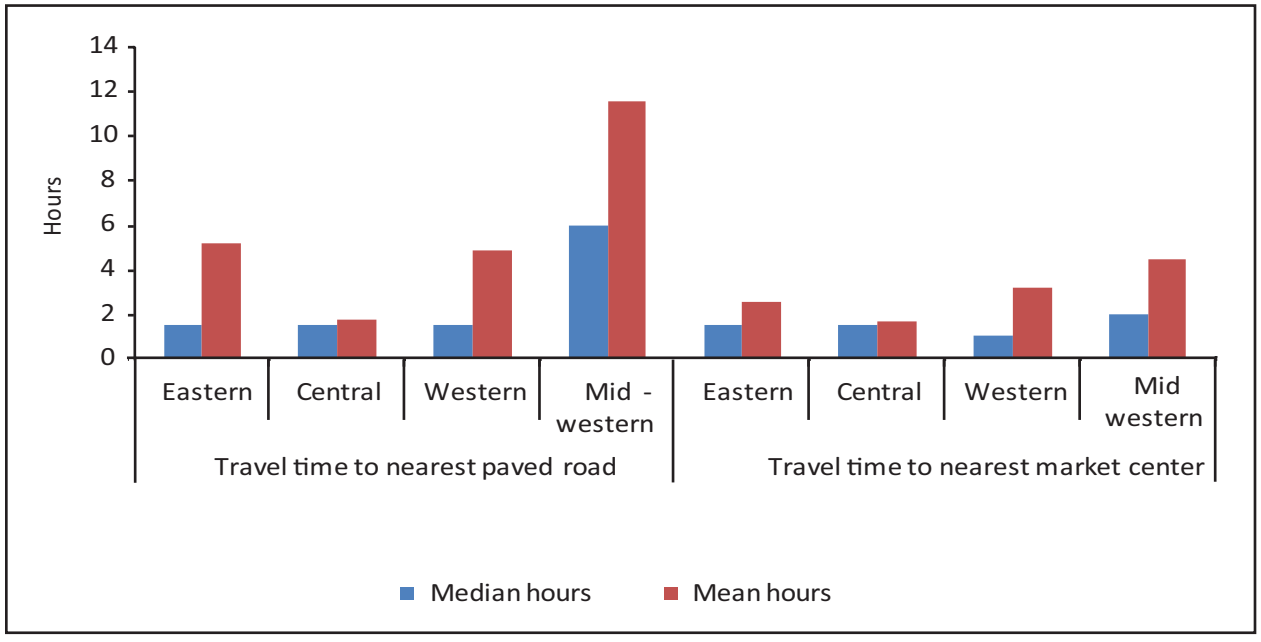
Table 3A.6: Real daily wages from agriculture and nonfarm sectors, Nepal (Rupees in 1995/96 real prices)

Region/Category	Agriculture			Non-skilled non-agriculture			Skilled non-agriculture		
	1995-96	2003-04	% Change	1995-96	2003-04	% Change	1995-96	2003-04	% Change
Urban	42	58	38	98	92	-6	138	461	234
Rural	44	55	25	79	98	24	81	135	67
Region									
Kathmandu	-	-	-	103	83	-19	173	672	288
Other urban	40	57	43	91	101	11	111	170	53
Rural Western Hill	49	54	10	75	91	21	72	111	54
Rural Eastern Hill	37	54	46	84	90	7	83	137	65
Rural Western *Terai*	50	63	26	81	94	16	97	126	30
Rural Eastern *Terai*	42	54	29	75	113	51	80	159	99
Education level (years)									
Illiterate	43	52	21	73	83	14	-	-	-
Less than 5	53	61	15	82	99	21	-	-	-
5 – 7	44	65	48	94	99	5	-	-	-
8 - 10	45	63	40	86	108	26	75	113	51
11+	-	-	-	121	142	17	121	426	252
Gender									
Male	48	63	31	84	104	24	102	351	244
Female	39	47	21	59	54	-8	65	126	94
Nepal	44	55	25	81	97	20	94	295	214

Source: CBS, 2005. Note: - too few observations.

Figure 3A.1: Travel time from various regions



Source: CBS, 2005.

Table 3A.7 Some major employment and livelihoods programs

Program	Implementation Agency	Coverage	Purpose	Activities
Rural Access Improvement and Decentralization Project	World Bank and Government of Nepal	30 districts	To build/ repair/maintenance all-weather local rural roads & carry out community Infrastructure/transport services	Construction of 160 Km all- weather road, 25 km new road, and 55 suspension bridges were completed under the project in FY2007/08.
Rural Reconstruction and Rehabilitation Program	Government of Nepal, Asian Development Bank and OPEC Fund for International Development- also Department for International Development Department and Swiss Agency for Development Cooperation	18 districts	To develop local infrastructure and Enhance access to markets	Work initiated in 2008
Rural Community Infrastructure Development Program	World Bank, World Food Program and Government of Nepal	21 districts	To enhance self-help capacity of rural communities by improving situation of food security and by building and maintaining community infrastructure	114Km rural road was constructed and 9,000 MT food was distributed in program districts during FY2007/08.
Decentralized Rural Infrastructure and Livelihood Support Project	Government of Nepal	18 districts	To develop socio-economic rural infrastructure, expand road network and build institutional capacity at the local level	FY2007/08, extensive survey and design of 109.5Km, rehabilitation of 48Km, and construction of 25.7Km roads were carried out and 48 suspension bridges were built
Rural Access Program (RAP) - Phase II	Government of Nepal and Government of the United Kingdom	6 districts of Bhojpur, Sankhuwasabha, Khotang Achham, Doti and Dailekh.	To improve lifestyle of the poor through development of rural roads & infrastructure	Preparatory works of this project was completed in FY2007/08. Out of the target of opening 365 Km track in the first phase in FY2008/09, survey design and cost estimation of total 365.5 Km road is completed for 12 roads in 7 districts

(Contd…)

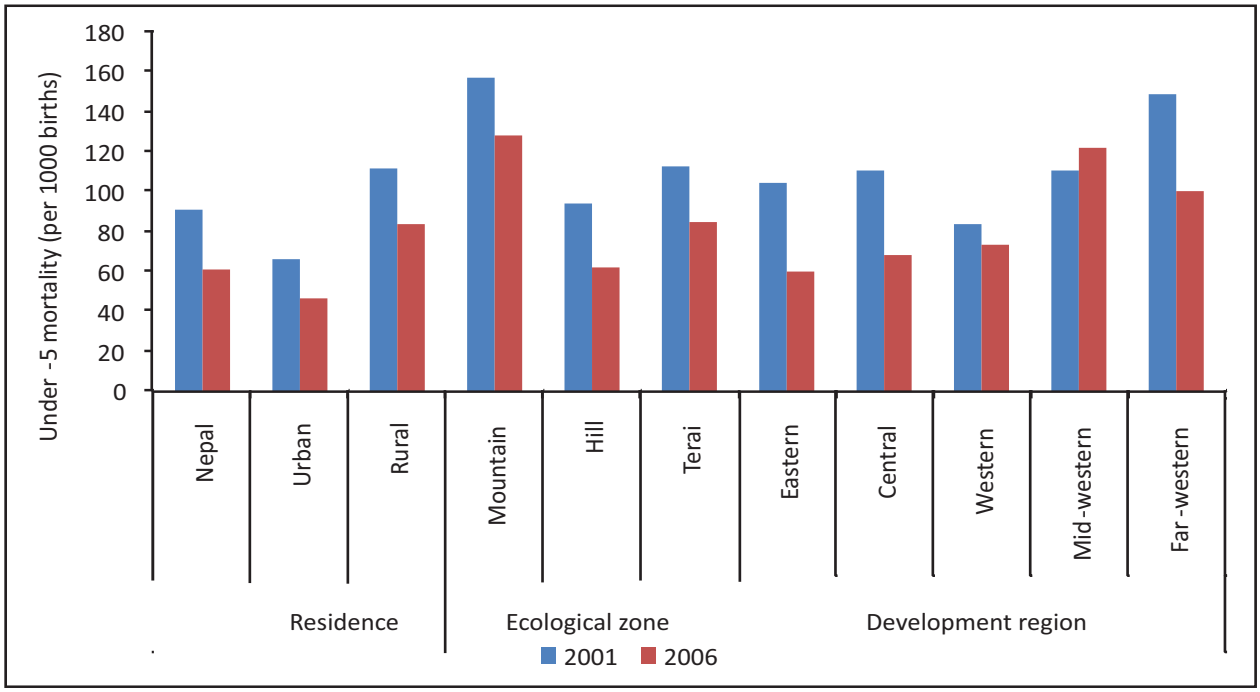
Table 3A.7—Contd.

Program	Implementation Agency	Coverage	Purpose	Activities
Local Infrastructure Development Program for Livelihood Improvement.	Swiss Government and Government of Nepal	Focus on women, children and backward communities of 6 districts of Achham, Dailekh, Doti, Ramechap, Dolkha and Jajarkot	To improve the living standard, income generation opportunities & cash crop production in food scarcity areas of program districts	FY2007/08 construction of 23 systematic small and mid-sized irrigation system, 16 school buildings and 1 health post building
Karnali Employment Program	Local Development Ministry and Government of Nepal	Karnali Zone	To create employment opportunities	Since FY 2006/07 , 969 small-scale projects completed providing 14 days' employment to 67,999 households
Western Upland Poverty Alleviation Project	International Fund for Agriculture Development in joint investment of the private sector, DDCs, VDCs, Government of Nepal	Jumla, Humla, Mugu, Rukum, Rolpa, Dailekh, Kalikot, Jajarkot, Dolpa, Bajhang, and Bajura of Western and Mid-Western Regions	For social mobilization and rural employment creation by building local infrastructure for social services, agriculture etc.	29 infrastructure activities like construction of drinking water and irrigation schemes, schools, health post building etc. completed with capacity building activities. 64 Leasehold Forestry User Groups formed, medicinal herb farming in 17 ha, distribution of plants, seed kits and other inputs, formation of groups under micro-finance/ marketing programs, mobilization of internal saving and credit, and trade fairs etc.
Program on Linking Local Initiatives to Knowledge and Skills	Swiss Government and Government of Nepal, intermediary institutions (national/ local NGOs, and Community-Based Organizations)	Dailekh, Achham, Doti, Jajarkot, Banke, Bardiya, and Surkhet	To provide technical assistance services for supporting implementation of local demand/need-based partnership programs	During FY2007/08, income generating activities such as vegetable farming, seeds production, herbal farming, marketing management of produced goods etc. Plus capacity enhancement of partners

Source: MoF, 2009

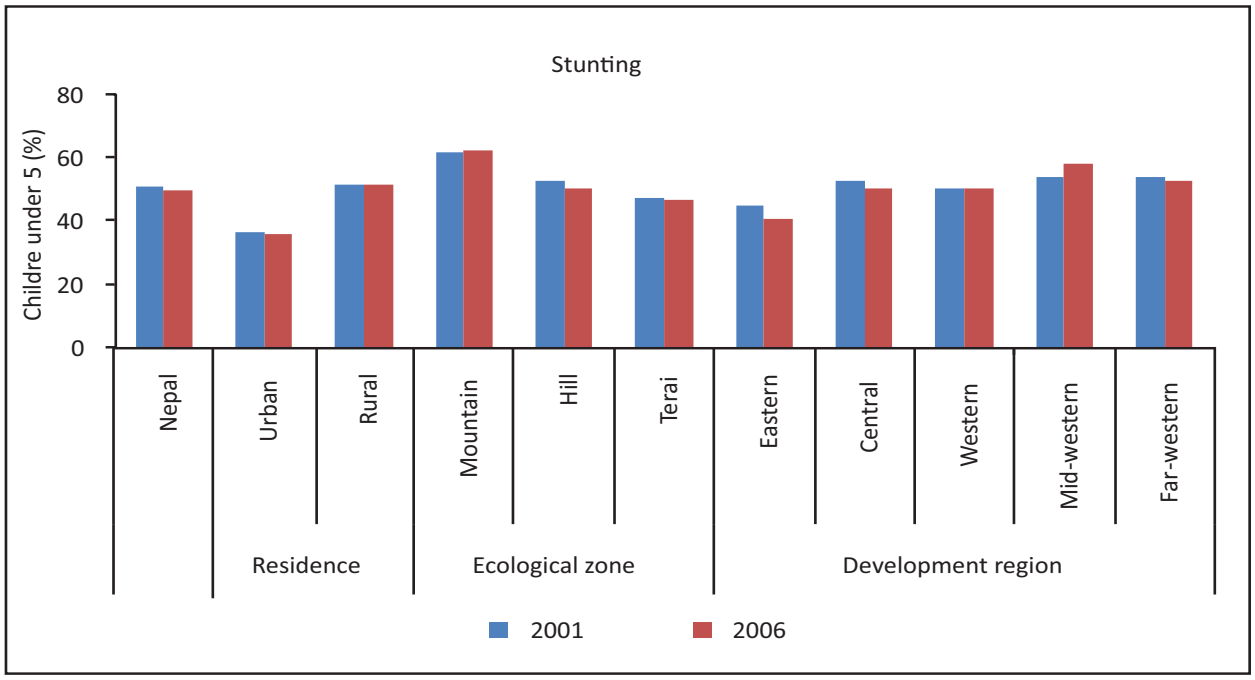
A.4: Absorption and Utilization

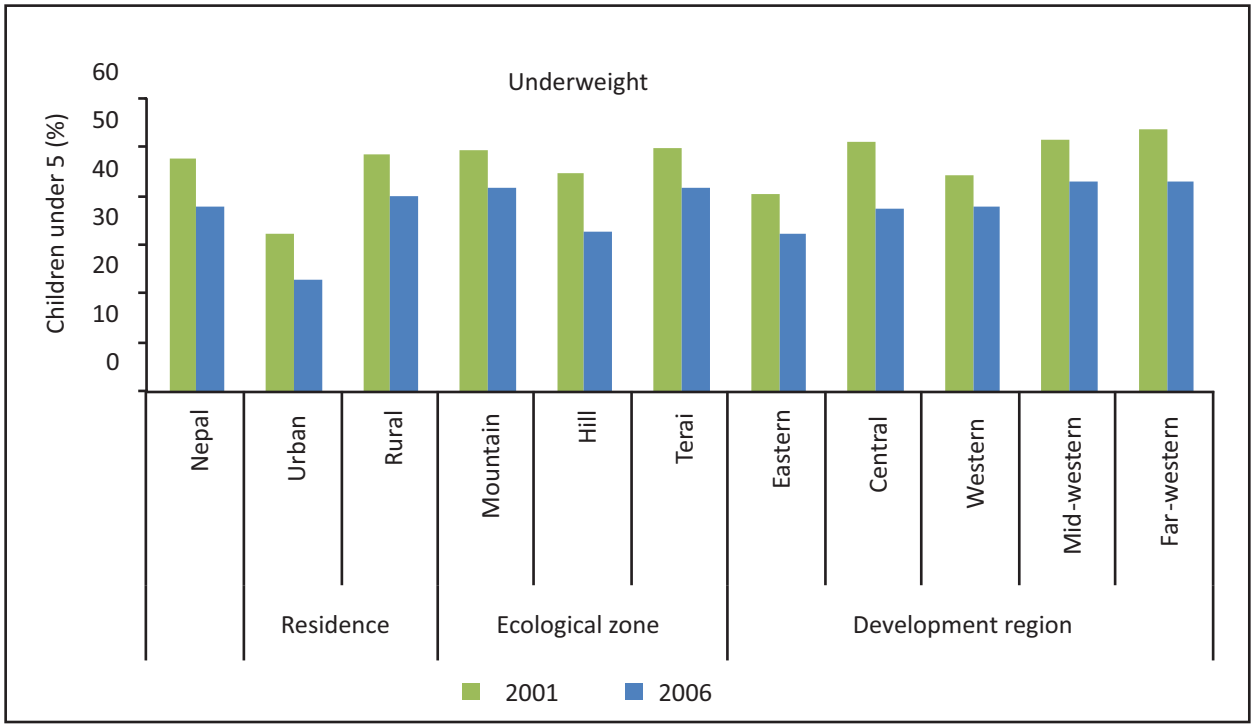
Figure 4A.1: Trends in under 5 child mortality rates in Nepal



Source: NDHS, 2006

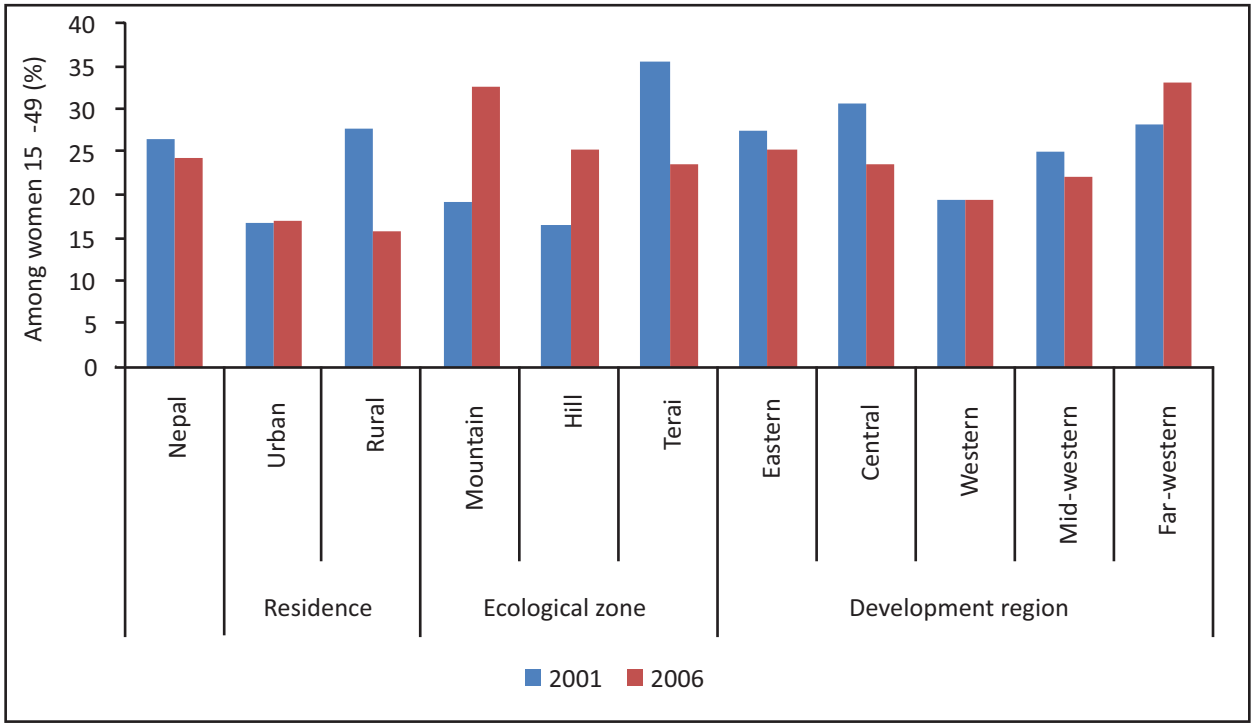
Figure 4A.2: Trends in under 5 nutrition in Nepal





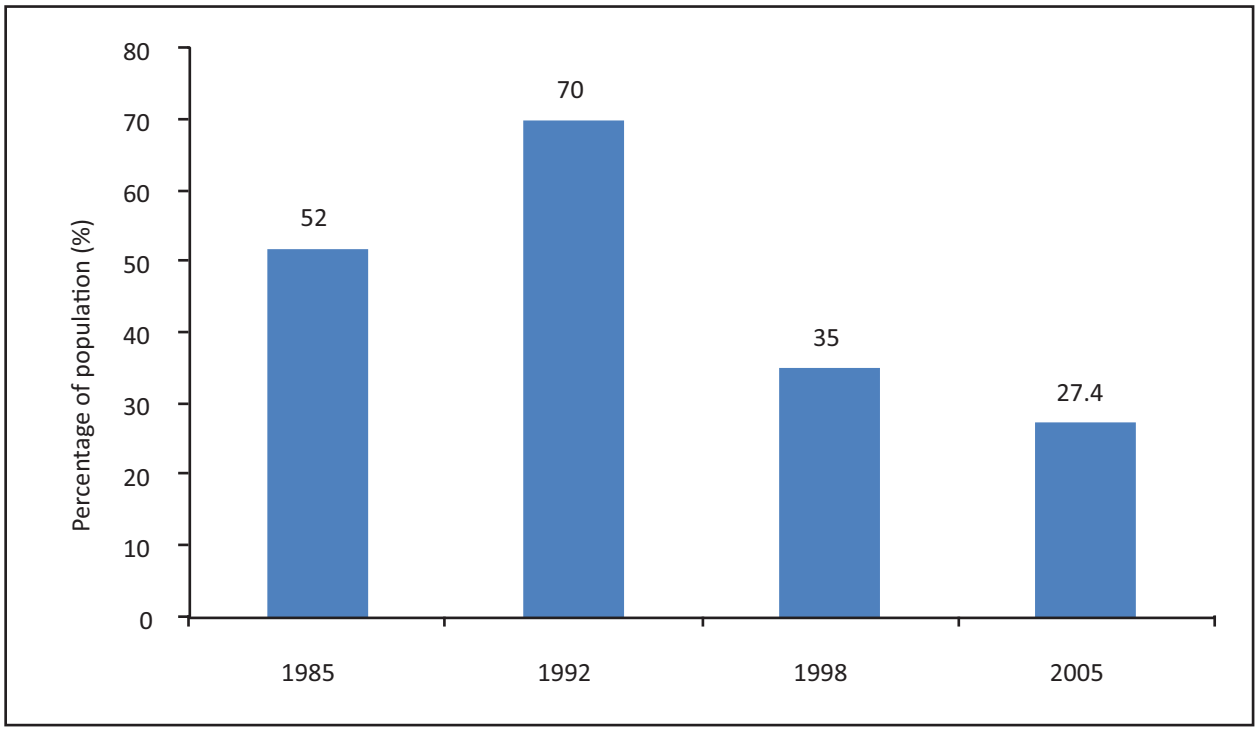
Source: NDHS 2006

Figure 4A.3: Trends in region-wise indicators of thin women (with BMI< 18.5 kg/m2)



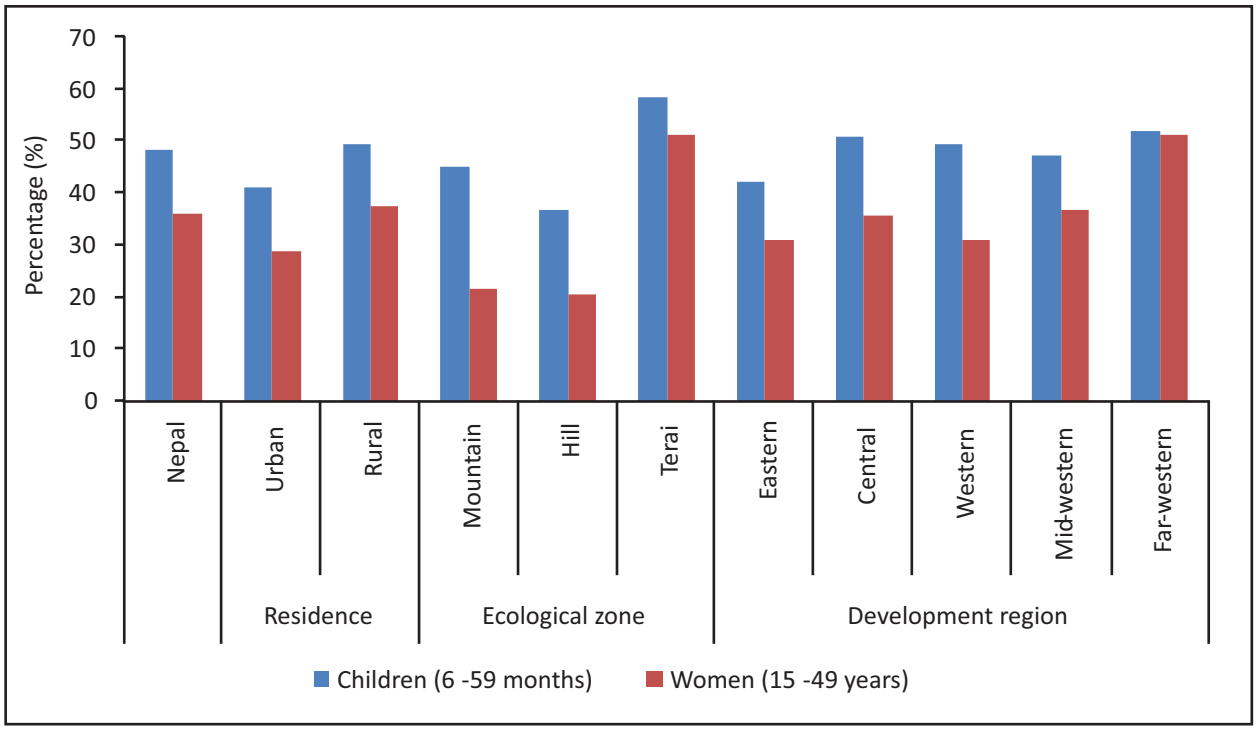
Source: NDHS 2006

Figure 4A.4: Trend of low urinary iodine (<100 µg/l)



Source: NDHS, 2006

Figure 4A.5: Prevalence of anemia among women and children, 2006



Source: NDHS 2006

Table 4A.1 Trends in literacy rates in Nepal by sex (%)

Groups		Male			Female		
		1994/95	2003/04	% Change	1994/95	2003/04	% Change
Nepal		52.15	63.5	21.8	24.35	38.9	59.8
Residence	Urban	77.31	84.5	9.3	50.07	64.2	28.2
	Rural	50.07	59.3	18.4	22.43	34.3	52.9
Ecological zone	Mountain	43.44	55.7	28.2	13.42	31.8	137.0
	Hill	45.44	59.5	30.9	19.92	34.5	73.2
	Terai	61.75	69.7	12.9	31.06	44.9	44.6
Development region	East	54.2	62.1	14.6	29.57	37.6	27.2
	Central	50.19	58.4	16.4	20.75	35.5	71.1
	Western	58.24	75.1	28.9	32.82	50.7	54.5
	Mid Western	46.94	64.2	36.8	17.7	35.4	100.0
	Far-Western	49.98	63.8	27.7	14.85	33.4	124.9
Consumption Quintile	Poorest	31.94	36	12.7	8.8	15.8	79.5
	Second	41.26	52.7	27.7	15.6	27.2	74.4
	Third	45.66	62	35.8	20.93	35.8	71.0
	Fourth	63.01	73	15.9	30.49	48.5	59.1
	Richest	74.9	87.1	16.3	43.96	63.6	44.7

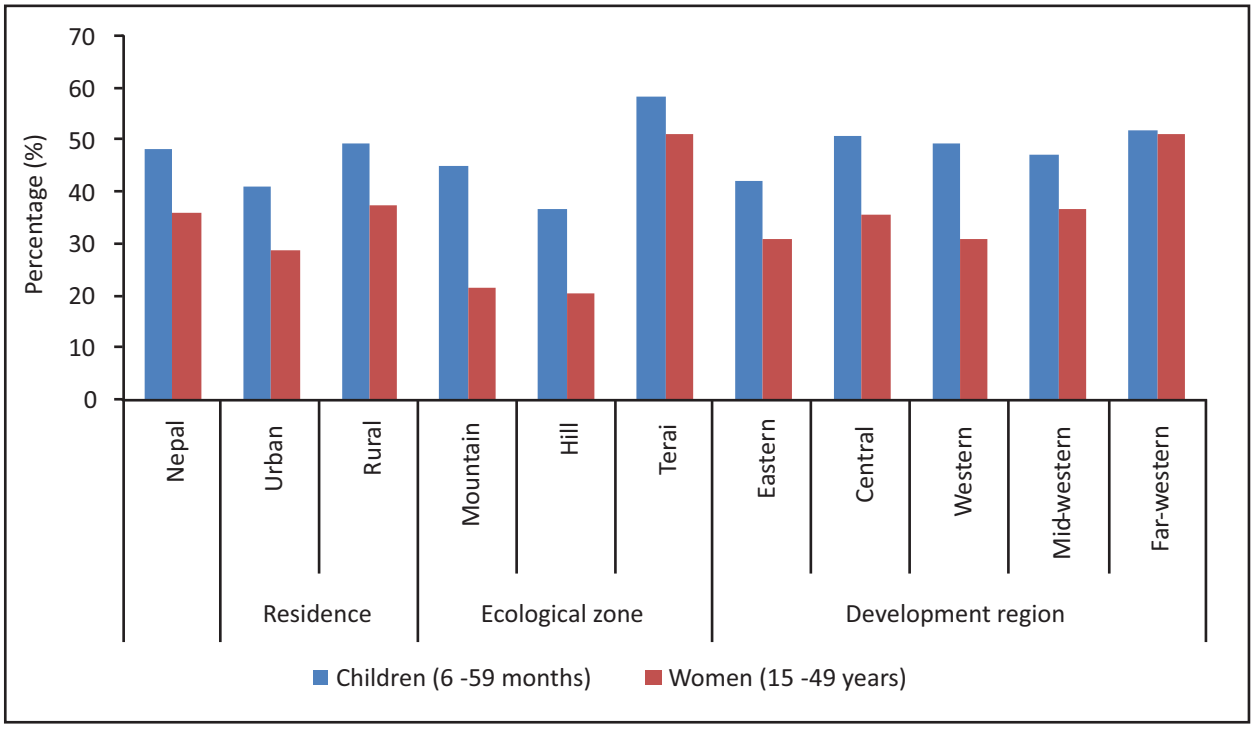
Source: CBS, 2005

Table 4A.2 Geographical distribution of health services and personnel (%) 2001

Region	Population	Doctors	Nurses and ANM	Retail Pharmacies
Eastern	23	14	23	17
Central	35	70	40	64
Western	20	11	26	13
Mid-western	12	3	8	4
Far-western	10	2	3	3
All	100	100	100	100

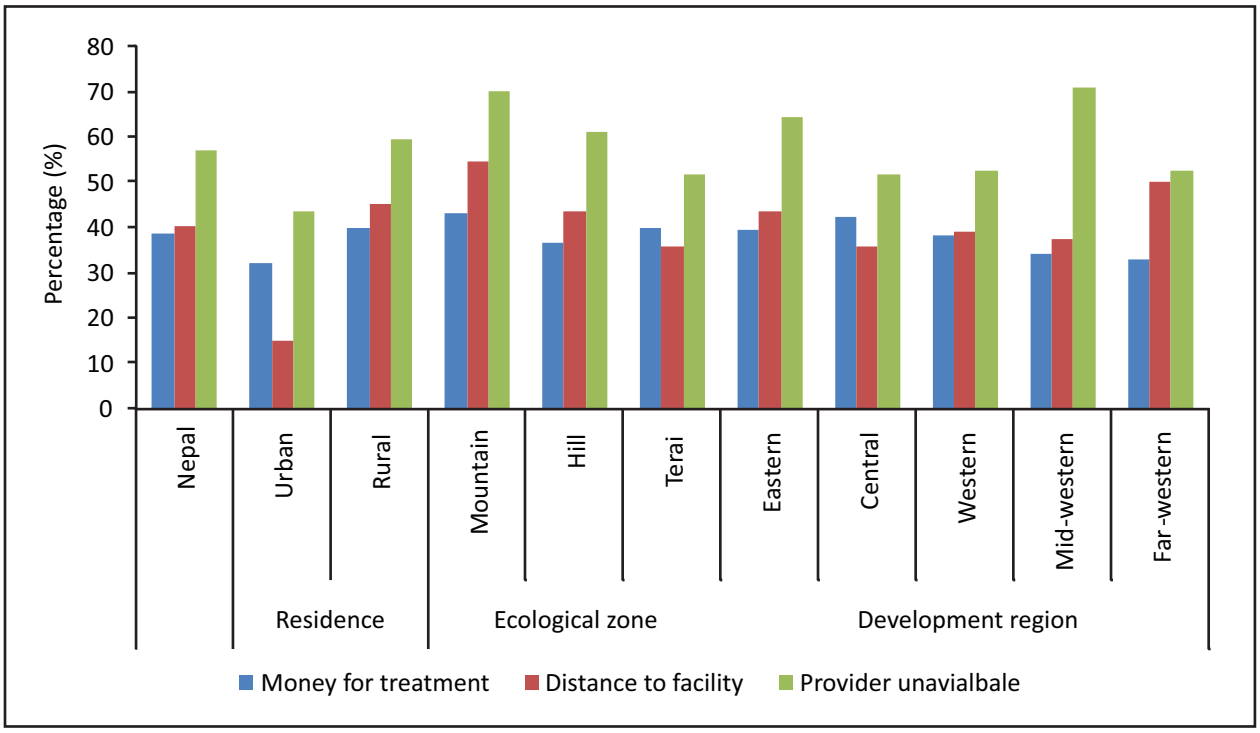
Source: CBS, 2005

Figure 4A.6: Mean expenditure on healthcare - government and private (in Rs., 2003-04)



Source: CBS, 2005

Figure 4A.7: Percentage of women (age 15-49) who reported problems in accessing healthcare (2006)



Source: NDHS, 2006

Table 4A.3 Some major absorption and utilization related programs

Program	Implementation Agency	Coverage	Purpose	Activities
Health and Nutrition				
Integrated Child Disease Management and Extended Vaccination and National Polio Vaccine	Government of Nepal and partners	64 districts- targeting women and children	To improve health and nutritional outcomes amongst children	Micronutrient supplement distribution, treatment against diarrhea and epidemics, vaccinations
School Health and Nutrition Project	Government of Nepal	Piloting	To improve health and nutritional outcomes amongst children	-
Maternal and Child Healthcare program	Government of Nepal	FY 2008/09, 42000 pregnant and lactating mothers and children	To improve health and nutritional outcomes amongst women and children	Micronutrient supplement distribution, fortified foods
National Health Education, Information, and Communication	Government of Nepal and partners	56,357 home visit programs 840 schools for health education (FY 2008/09)	Increase health and nutrition awareness	Home visits and awareness campaigns
Population Education and Maternity Health	United Nations Fund for Population Activities and Government of Nepal	6 districts- Saptari, Mahottari, Rautahat, Kapilvastu, Dang, and Dadeldhura	To establish gender justice through improved reproductive health of women.	Reproductive health treatment, training to VDC and community members on gender and social inclusion like scholarships to Dalits, women, and extremely poor girls
Water Supply and Sanitation				
Rural Drinking Water and Sanitation	Government of Nepal	75 districts	To provide sustainable, reliable, and sufficient drinking water and sanitation facilities to 40% of the population	Gravity-flow drinking water, tube well installations, rainwater harvesting, construction of toilets, and environmental awareness raising
Western Nepal Rural Drinking Water and Sanitation	Government of Finland and Government of Nepal	8 districts	To provide sustainable, reliable, and sufficient drinking water	Initiated in FY 2008/09
Community- based drinking water and sanitation and Small Town Drinking Water and Sanitation	Government of Nepal and Asian Development Bank	Districts lagging behind in HDI	to complete 106 out of the 690 projects under implementation to provide basic drinking water and sanitation services to 126,000 people	Expansion of health and sanitation facilities, education on the same through community groups and local governments
Education and Literacy				

(Contd…)

Table 4A.3—Contd.

Program	Implementation Agency	Coverage	Purpose	Activities
Remote Area Students Support	Government of Nepal	Karnali Zone	To increase education attainment and tackle undernourishment	All school girls & Dalit students of Karnali zone received scholarships and day meals
Food for Education and School Meal program	Government of Nepal and World Food Program	13 districts- in FY 2008/09, 145,013 students covered	the aim to increase primary enrolment rate by 5%	Food distribution
Girl student motivation program	Government of Nepal and World Food Program	41,066 girl students in 9 districts in FY 2008/09	Girls with class attendance > 80% to be provided with 2 liters of edible oil/month to raise enrolment rate by 5%	Food distribution

Source: Economic Survey, 2008/09

Table 4A.4 Improvements in indicators of key health and nutritional interventions

Group		% Children (6-59 months) receiving Vitamin A supplements			% Women giving live birth by Antenatal Care Worker			% Children age (12-23 months) receiving all basic vaccines		
		2001	2006	% Change	2001	2006	% Change	2001	2006	% Change
Nepal		81	87.5	8.0	49.1	73.8	50.3	65.6	82.8	26.2
Residence	Urban	75.3	81	7.0	82.4	87.9	6.7	74.9	86.3	15.2
	Rural	81.4	88.5	8.7	46.6	71.7	53.9	65	82.4	26.8
Ecological zone	Mountain	80.5	87.5	8.7	30.7	56.3	83.4	63.5	71.3	12.3
	Terai	81.9	86.9	6.1	44	69.1	57.0	70.4	81.6	15.9
	Hill	80.4	88	9.5	56.1	80.5	43.5	61.8	86.4	39.8
Development Region	Eastern	79.5	87	8.8	54.3	81.2	49.5	73.8	86.2	16.8
	Central	78.2	86.1	10.1	52.6	75.9	44.3	60	78.3	30.5
	Western	86	89.7	4.3	56.5	69.1	22.3	64.8	88.9	37.2
	Mid-western	83.6	90.8	8.6	35.1	61.4	74.9	69.9	80.8	15.6
	Far-western	80.4	86.6	7.7	33	74.7	126.4	59.7	80.5	34.8
Sex	Male	80.9	87.7	8.4	-	-	-	67.5	84.9	25.8
	Female	81.2	87.3	7.5	-	-	-	63.9	80.6	26.1

Source: NDHS 2006

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